DP Crime Not Abating — Victims Just Silent

By John P. Hebert
Of the CW Staff

Although there appears to be less in the news about computer system sabotage, the incidence of major computer crimes apparently hasn't subsided.

Rather, corporate victims of computer crimes are more reluctant to release information to a press anxious for sensational news, according to Donn Parker, author of *Crime by Computer* and a researcher at Stanford Research Institute.

The targets of such crimes — usually large financial institutions — may not be publicizing the fact a computer system has been violated illegally because they could lose more from "bad publicity" which damages their competitive position than from the crime itself, Parker said.

Figures for the total corporate loss in terms of time, money and reduced confidence never have been published, Parker indicated, although the U.S. Chamber of Commerce estimated $100 million would be siphoned annually from institutions' computer data banks.

The alarming note is that there could be much worse prospects for businesses and correspondingly better prospects for computer criminals in the future, Parker said in an interview recently.

In Los Angeles, Spencer Nilson, publisher of a newsletter for bank executives and once a credit investigator, said people in credit card organizations like Carte Blanche, Diners Club or BankAmericard are told not to divulge such losses, even though they amounted to $700,000 or more last year and $500,000 in 1974.

"Business executives don't want the losses discussed because it would cause a panic," he said.

Banks comprise a large portion of the victims of computer crime, but

(Continued on Page 6)

COMPUTERWORLD

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NEWSPAPER

Users Planning to Spend 11% More Next Year

By Nancy French
Of the CW Staff

WALTHAM, Mass. — Users will step up DP spending by an average of 11% in 1977 as a result of heavier workloads and new applications.

This "real growth" contrasts with both 1975 and 1976, when users' budget increases were gobbled up by inflation, cost-of-living raises for employees and limited new hardware, according to the annual U.S. DP budget survey conducted by International Data Corp. (IDC), here.

Large users' budget increases of 8.5% will be exceeded by those of medium-scale users, who reported 12.7% higher budgets for 1977, the market research firm found.

Key indicators of the positive trends revealed by the survey include a projected 12.3% jump in hardware spending and virtually no budget cutting, IDC said.

For the first time since the late 1960s, growth in hardware spending will outpace growth in other DP budget categories. Especially significant is the fact that the growth will occur on top of hardware price cuts by the major mainframe manufacturers.

Only three of the 128 large and medium-size organizations in the survey sample anticipate reductions in their 1977 DP budgets — a sharp contrast to recession-constrained 1975 when more than 11% of the sample recorded budget cutbacks.

More than 40% of those surveyed plan a major CPU upgrade or addition during 1977. These expansions in capacity are a direct result of a commitment to data base/data communications as well as the increased workloads users are experiencing, IDC said.

DP employment is expected to grow by 2.8% — slightly less than in 1976 — which is indicative of continued new application development, IDC said.

Expenditures for transmission facilities will rise by 16.7%, also slightly less than in 1976 but higher than anticipated since most large organizations have already implemented their teleprocessing networks.

The only potentially negative sign picked up in the survey concerned users' plans

(Continued on Page 4)

Wanted: Experienced Antitrust Lawyer

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The Department of Justice is looking for someone to replace the attorney heading its antitrust suit against IBM in the event Raymond M. Carlson retires from government service next year as planned.

Some observers of the 19-month-old trial in New York City fear the wrong choice of a successor to Carlson would hamper the government's obligation to finish the case.

They also fear the exodus of government attorneys back to Washington as they finish their portions of the Justice Department presentation in court is "starving" the government team.

O'Leary Turns Down Job

One candidate considered by the Justice Department for Carlson's job is Howard ("Buck") O'Leary, staff director and chief counsel for the U.S. Senate Antitrust and Monopoly Subcommittee here.

While he talked with the department about stepping into Carlson's shoes, O'Leary declined for personal reasons.

"I was intrigued with the prospect of trying the case and would have considered it a professional challenge," O'Leary said. His reasons for saying "no" had nothing to do with the length of U.S. vs. IBM or with the commitment that would be needed to see it through, he added.

The Justice Department had no comment on the offer it made to O'Leary, according to Lewis Bernstein, chief of special litigation in the department's Antitrust Division.

Carlson "has made it clear he is eligible for retirement in November 1977. It would be imprudent of us not to look for a replacement" in the event the lead attorney decides to exercise his option, he said.

Asked about rumors that he himself might retire at the end of this year, Bernstein replied, "I am not retiring."

Carlson had no comment on the O'Leary offer, but he did confirm his eligibility for retirement on Nov. 2, 1977. If and when the Justice team's head lawyer on this case does announce plans to leave, the judge is likely to be the first to know, he said.

The Justice Department does seem to have cut back on its team in New York over the last several months. In February, the government had 21 full-time attorneys working on the case and 25 full-time support people, including economists, computer advisers, secretaries and clerks.

Last week, Carlson said the team now consists of 17 full-time attorneys and 27 other full-time employees.

Burroughs Adds CPUs For Communications; Prices Unbundled

By Ronald A. Frank
Of the CW Staff

DETROIT — Burroughs Corp. has introduced three communications-oriented processors that feature separately priced hardware and software.

The B870 and B860 systems were designed for electronic funds transfer systems and multilocation message-switching networks; they are compatible with most existing Burroughs mainframes and terminal systems, according to a spokesman.

The communications processors mark the first time Burroughs has separately priced its operating system software as well as its applications packages, he stated.

Three models were introduced. The

(Continued on Page 6)

Could IBMer End Up Responsible For Pursuing Suit Against Firm?

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA — President-elect Jimmy Carter's transition team is now apparently considering an IBM director for the post of U.S. Attorney General in the new Administration — the one Cabinet post most responsible for prosecuting the government's ongoing antitrust suit against the firm.

At the same time, another IBMer — Jane Cahill Pfeiffer — surprised the Carter camp by taking her name off the list of potential Cabinet members just before she was slated to be named to a post.

The possibility for Attorney General is Patricia R. Harris, a partner in the firm of Fried, Frank, Harris, Shriver & Kampelman, who has been on the IBM board since 1971.

When asked about the likely appointment of an IBM director to a position which could have a major impact on the government's antitrust case, Carter's transition press office said last week it "can't comment on people being speculated about in the press."

Harris has an impressive background. She served as dean of the Howard University Law School and was at one time ambassador to Luxembourg. She has also served as an attorney in the Justice Department and is now a director of the National Association for the Advancement of Colored People (NAACP) Legal and Educa-

(Continued on Page 2)

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Did FCC Forget About Justice Opinion Agreeing Dataspeed 40/4 Is DP Device?

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — The Federal Communications Commission (FCC) may have ignored an opinion from the Justice Department when it decided to authorize a tariff for the AT&T Dataspeed 40/4.

The FCC ruling reversed a decision made last March by the chief of its Common Carrier Bureau, Walter Hinchman. Hinchman rejected the terminal for tariffing on grounds the terminal is a DP device [CW, Dec. 6].

In September — six months after the Hinchman ruling and almost three months before the FCC overruled the bureau chief — a deputy assistant attorney general in the Justice Department's Antitrust Division said in a letter that he agreed with Hinchman.

"Based on the decision of the Common Carrier Bureau that the Dataspeed 40/4 is a data processing service . . . [AT&T] may not engage in the business of selling or leasing such equipment, whether directly or through a subsidiary," Jonathan C. Rose wrote.

While "data processing services as such . . . are not directly regulated by the commission at present," Rose noted that in 1956 "AT&T entered into an agreement that the Bell System would restrict its activities generally to offering communications services subject to public regulation.

"Hence the bureau chief's factual determination [under] the commission's rules and the 1956 agreement read together could mean AT&T cannot market the Dataspeed 40/4 terminal to the general public," the Justice Department letter said.

Court Must Decide

Addressing the question of whether the terminal is a communications or DP service, the letter said, "In the final analysis, the district court which entered the [Consent] Decree is responsible to determine what is or is not a 'common carrier communications service.' The Department of Justice has consistently been of the opinion that [being] tariffed at the state level alone does not resolve the question.

"In order to constitute a permissible activity under the [Consent Decree], the offering must be a communications service or facility and be subject to public regulation," Rose said.

A spokesman for the Common Carrier staff said the Justice Department had assumed in its opinion that Hinchman's ruling — that the Dataspeed 40/4 is a DP device — was correct.

"If the commission were to make different assumptions, then the Justice Department letter is irrelevant," the spokesman said."If you assume that the Dataspeed 40/4 is not a data processing device, then the Justice assumptions don't hold."

"We didn't say we necessarily agreed with the bureau chief's determination," a Justice Department source said. But if the FCC finds the terminal is a communications device, then Justice "will live with the decision"; the actual determination rests with the FCC, he said.

Normally in this type of judgment decision the Justice Department defers to the FCC. In this situation, however, there was a dispute within the Common Carrier Bureau and within the commission as to whether this device is a DP or a communications service, he pointed out.

It will therefore be up to the U.S. District Court in New Jersey (which wrote the Consent Decree) to decide how the Dataspeed 40/4 should be classified, he said. But it will be the responsibility of one of the parties to bring this to the court, he added.

The FCC's decision to tariff the AT&T terminal may have been made without sufficient evidence or a formal proceeding to hear the merits of the issue, several regulatory experts said, but the Justice Department source said it would probably be hard for a court to find the commission had acted in an arbitrary or capricious manner.

The final determination will depend on the outcome of the second Computer Inquiry, he said.

NBS Approves IBM Algorithm As Federal Encryption Standard

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — A data encryption algorithm designed to provide a high level of security for information stored by and transmitted between computer systems has been approved as a Federal Information Processing Standard (Fips) by the National Bureau of Standards (NBS).

The official publication date for the standard is expected to be Feb. 15. Six months after publication, the standard will become effective for federal DP organizations, an NBS spokesman explained.

Encryption is accomplished by electronic devices that implement the mathematical algorithm specified in the standard, NBS said. The algorithm was developed by IBM, which has agreed to grant nonexclusive, royalty-free licenses under its patents to make, use and sell electronic devices which comply with the standard, the bureau added.

To place the new standard in perspective with other computer security measures, NBS will hold a conference on Feb. 15 at its Gaithersburg, Md., facilities. Those interested in attending should send a $25 registration fee to Anne Shreve, NBS Systems and Software Division, Washington, D.C. 20234, the bureau said.

Copies of the encryption standard, published in Fips Publication 46, will be available — at a price yet to be determined — from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161.

Carter Considering IBM's Harris

(Continued from Page 1)

tional Defense Fund, as well as serving on the boards of the Chase Manhattan Bank, Scott Paper Co. and Georgetown University.

Harris is one of three IBM directors with a shot at landing a job in the Carter Administration. Cyrus Vance has already been designated Secretary of State and Harold Brown is in the running for Secretary of Defense [CW, Dec.13].

In addition, Dr. Lewis Branscomb, IBM vice-president and chief scientist, is one of Carter's major advisers on science and technology policy and may land a job as Presidential science adviser.

However, in a last minute move, Pfeiffer, a former IBM vice-president, told Carter she didn't want to be Secretary of Commerce after all.

The surprise announcement came here last week at the time it was expected Carter would name her to that post.

Pfeiffer said she didn't want to move away from her husband — Ralph A. Pfeiffer, a senior vice-president at IBM — to take the job.

In addition, she noted she had thyroid surgery a year ago and did not feel she would be up to the strenuous demands of the job.

Pfeiffer is the second person with IBM ties to ask not to be named to a Cabinet job.

Earlier, Irving S. Shapiro, an IBM director, asked to be removed from consideration for the job of Treasury Secretary. However, he remains a close adviser to the President-elect on business matters.

On the Inside This Week

NEWS
FCC Hears Last Debate on Western Electric Divestiture 4
Inconsistencies Mar Experts' Testimony in Calcomp 5
Glaser Urges Caution in Development of EFT 7

EDITORIAL
Editorial: A Time to Reflect 10
The Human Connection: Stone on Appraisal of Service . . .11
Taylor Report: Confusion Surrounds Overbooking 11

SOFTWARE & SERVICES
Naming Goals, Finding Staff Precedes Design Work 12
'Daft' Links Datapoint, Honeywell Units 13

COMMUNICATIONS
Combined Services Seen Key to Cost-Effective Future . . .15
Vendor Cooperation Saving $10,000/Mo for Net User 16

SYSTEMS & PERIPHERALS
System Brings 'Miracle' to Maryland 18
Study Highlights Four Areas of Distributed Processing . . .19

MINIWORLD
Taxi Fleet's Mini Helps Speed Vehicles to Passengers 21
First User of Syfa Linking Remote Depot, Central Site . . .22
DSC Enhances, Cuts Price of Galaxy/5 23

COMPUTER INDUSTRY
GSA Opens Federal Teleprocessing Arena 24
International Trade Confronts Hostility: Anderson 24
Adapso Wants Public to Have Chance in EFT Race 25
IBM Lost 'Total Control' Over User Community: Biddle . .28

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Earlier Decision at Stake

FCC Hears Last Debate on Western Electric Divestiture

By **Edith Holmes**
Of the CW Staff

WASHINGTON, D.C. — The Federal Communications Commission (FCC) heard the final round of arguments here last week on whether Western Electric, the manufacturing and supply arm of the Bell System, should be divested from the communications firm.

The hearing was the most recent step in the FCC's six-year proceeding designed chiefly to determine whether Bell charges for interstate long distance telephone service to telephone and terminal users are lawful.

Many of the issues in this FCC Phase II Study are similar to those raised in the Justice Department's antitrust suit against AT&T, but the FCC investigation predates the suit and is a separate proceeding.

The commission met to hear exceptions to the initial decision on Aug. 2 by David I. Kraushaar, FCC administrative law judge. Kraushaar concluded the Bell System structure — consisting in part of Western Electric, Bell Laboratories and the operating telephone companies — serves the public interest and ought to be maintained.

In addition, Kraushaar decided AT&T's interstate long distance rates and charges are reasonable and just and the revenue levels of its operating companies are "reasonable and capable of" returning to the Bell System the 9.5% to 10% currently prescribed by the FCC.

Maintaining the self-sufficiency of the Bell System results in efficient service and lower costs to users, AT&T counsel Howard J. Trienens of Sidley & Austin in Chicago and Washington, D.C., argued the commission should affirm Kraushaar's rulings.

But the FCC's Common Carrier Bureau trial staff, led by Joseph A. Marino, posed divestiture of Western Electric as the only long-term way to open the communications market, both inside and outside AT&T.

Broad Competition Urged

Pointing out that Western Electric is not a public utility, not a monopoly and not regulated by the FCC, Marino said the wholly owned AT&T subsidiary should be made to compete in the broader marketplace.

As interim relief, he suggested the FCC order Bell to have Western Electric sell its equipment to independent general trade companies that could then "fight it out" with AT&T in the marketplace.

FCC chairman Richard E. Wiley repeatedly asked for alternatives between divesting Western Electric and leaving the Bell System intact. Quoting Kraushaar, Wiley asked Marino if divestiture wasn't "a simplistic, doctrinaire siren song which would be unwise at best and catastrophic at worst."

Other commissioners questioned whether their regulatory authority extends beyond protecting the public interest to ensuring competition in the telecommunications industry.

Immediate Action Asked

Trienens argued the FCC should resolve exceptions to the Kraushaar decision now rather than wait for a ruling in U.S. vs. AT&T. While competition is a relevant indicator of service to the public, it is not the essential element with which the FCC is concerned, he contended.

"Not to decide this case after all this record," Trienens said in referring to some 15,000 pages of exhibits and 16,000 pages of transcript, "is not an option."

The trial staff suggested the commissioners might want to wait for the outcome of U.S. vs. AT&T and an attorney from Stromberg-Carlson Corp. called the FCC procedure "an inappropriate means of treating the issue of competition."

Regardless of "whether the court decision [in U.S. vs. AT&T] involves divestiture of Western Electric, we think it will take a deeper look at the market data and potential remedies than was done in the initial decision here," the Stromberg-Carlson attorney said.

Stromberg-Carlson and International Telephone and Telegraph Co.(ITT) agreed that if Western Electric is permitted to maintain a monopoly in the Bell System and enter the independent market and if the independents don't enter the Bell market, the AT&T subsidiary will acquire a total monopoly except where vertically integrated companies exclude it.

ITT asked the FCC to go beyond Kraushaar's decision and stop Western Electric from being the purchasing agent for Bell Labs. The Bell competitor did not support divestiture, however, urging the commission instead "to change the internal structure of the Bell System so that it regulates itself."

Wiley has pledged that the commission will reach a decision on the question of divestiture by March 1. The FCC will also rule by then on whether the long distance rates are lawful and whether certain expenses — like charitable contributions and advertising — should be kept in the rate base and so charged to telephone user.

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Users Planning to Spend More

(Continued from Page 1)

beyond 1977, the report said.

Very few users contemplate any concrete expansion beyond next year, indicating any action they take will depend on new product introductions.

Figures were derived only from survey interviews and do not include data from small-scale or entirely new computer users, IDC noted. However, since large- and medium-scale users account for about 75% of DP expenditures, this annual survey has usually provided a good approximation of what to expect.

Users are allocating 35% to 40% of their budgets for hardware. For large users, this represents a 10.2% increase over last year and, for medium-size users, a jump of 13.7%.

A majority of users interviewed were near or had reached the maximum workload that can be sustained on their current configurations, and 42% reported operating central computers 18 or more eight-hour shifts per week. The average utilization for the entire sample was 15 eight-hour shifts per week, the highest figure ever recorded in IDC's annual survey.

'All-IBM' Attractive

Price reductions by all the large mainframers combined with the introduction of plug-compatible CPUs have interested many users with smaller rented or leased systems in upgrades, IDC said. As many as 60% of those users surveyed plan to upgrade.

These reductions are also causing a few of the larger, "more sophisticated" users in the sample to question the viability of distributed processing via minicomputers. Some users also indicated an "all-IBM" approach now appears more economically attractive, IDC said.

The introduction of peripherals that offer more attractive price/performance ratios are also "luring" many users into an acquisition mood for 1977, IDC said.

High-density disk drives — especially the IBM 3350 — are reducing the overall cost per stored character to the point where many users are now converting formerly tape-based jobs to disk.

DP employers appear to be less inclined to grant the generous salary increases seen in past years — a reflection of reduced inflationary pressures in the economy as a whole, IDC noted.

DP salaries should increase by 6.2% in 1977, a notch below this year's 7.5% average increase.

Only 2.8% of the sites surveyed will hire new employees compared with 4.5% last year, but programmers and analysts with data base and data communications expertise will continue to be in high demand.

However, more efficient, less people-intensive disk-based operating environments and increased use of on-line data entry and transaction processing will continue to reduce job opportunities for computer operators and keypunchers.

Although users will spend what sounds like a low zero to 10% on transmission facilities in 1977, this represents a 16.7% jump over last year's projections, making transmission facilities the most rapidly growing item in the DP budget.

IDC attributed this to network expansion by existing large-scale users as well as new networks for medium-scale users.

As for supplies, the inflationary pressure on paper supplies has "virtually ceased," according to IDC, and spending increases in this category are a result of increased usage.

Prices for magnetic media such as tape, cassettes and disk packs appear to be eroding despite price hikes for raw materials. Users said they are saving money by competitively bidding quantity media purchases.

Users wishing to avoid increases personnel and programming costs will continue to purchase outside software packages when they fulfill program needs.

Minor Inconsistencies Mar Experts' Calcomp Testimony

By Molly Upton
Of the CW Staff

LOS ANGELES — Three expert witnesses in the California Computer Products, Inc. (Calcomp) vs. IBM antitrust case here all testified IBM dominates the markets for computers and peripheral equipment.

But IBM's lead attorney was able to point out inconsistencies in the testimony of each, which may affect how the jury views their overall evidence.

The three testified IBM held a majority share of the general-purpose computer market between 1966 and 1972, but two of the witnesses had to correct minor points in their statements on cross-examination by IBM attorney David Boies. The third indicated he didn't really understand the basis of some statistics he used.

Boies pinpointed a few discrepancies when interrogating University of Arizona assistant professor of economics Gerald W. Brock on market share data compiled from Census I.

Census I includes data on DP product revenues between 1952 and 1970 from 751 of the 2,827 firms polled as part of Control Data Corp.'s antitrust suit against IBM.

Brock's study on the general-purpose systems market contained a $100 million overvaluation of installed IBM 2402 tape drives, he admitted under Boies' questioning.

The professor said this would reduce IBM's share in 1970 from 63.8% to 61.5% in the market which included general-purpose CPUs, tape and disk drives, line printers, card readers and other products that satisfied the criteria of demand and supply substitutability.

Brock initially said his statistics were accurate within ± 2% between 1963 and 1967 and ± 3% from 1968 to 1970.

Study's Calculations Questioned

Boies also led Brock to agree his study omitted $7.9 million in revenues generated by Potter Systems and raised the question of how $30 million in revenues from Ampex Corp. were allocated in the study.

However, on his second day of testimony, Brock told Calcomp attorney Max Blecher his recalculations on these and other matters would reduce IBM's share only .9% for a total of 62.9%.

These recalculations also included considering a response to the Census I from Calcomp, which was originally excluded because Brock deemed it lacked sufficient information.

Brock had previously estimated IBM's share of the general-purpose systems market at an average 78.4% between 1961 and 1965 and at 70.7% between 1966 and 1970.

Including minis and specialized peripherals, terminals, communications gear, maintenance equipment and specialized application units, however, IBM's share was somewhat less, averaging 75% between 1961 and 1965 and 65.6% between 1966 and 1970, he said. By including teletypewriters as well as the other factors in the broader market, IBM's share in 1970 was reduced from 58.1% to 56.4%, he testified.

Avoids Quick Answers

Patrick J. McGovern, chairman of International Data Corp. (IDC), began to visibly suffer from jet lag during his first afternoon on the stand. He made misstatements on two issues while attempting to avoid giving yes or no answers.

In one instance, McGovern indicated IBM's share of disk drives attached to IBM CPUs did not include the 3340. He later corrected himself upon Boies' urging.

After a long series of questions by Boies, McGovern indicated IDC calculated the value of plug-compatible manufacturers' (PCM) installations of double-density 2314-type drives based on the value of IBM's double-density 2314s. But IBM never offered such a product. Blecher established McGovern had been thinking of the calculations involved in determining values for the double-density 3330.

During his second day of testimony, McGovern explained he didn't like giving yes or no answers because Boies' terminology was often inconsistent with his own.

At one point Judge Ray McNichols told Boies to cease attempting to elicit one-word answers. With that technique, he said, one can ask questions such as "Has the man stopped beating his wife?"

Effective Phone Call

Montgomery Phister Jr., a writer and consultant, also testified on the market share issue. His most recent position in the industry was vice-president of engineering at Xerox Data Systems, which he left in 1972.

Phister's testimony escaped relatively unscathed, but Boies attempted to illustrate that Phister did not understand the complexities behind the data that he used, most of which came from IDC.

Boies revealed that Phister had not updated his statistics, as IDC had, to reflect data from IBM on its installations which the corporation had released under court order in a previous case. Phister included both the original IDC figures and the data released by IBM, but did not correlate the two.

Later, Boies picked up the witness' remarks from a book he had written which called industry data "staggeringly unreliable." Phister said the phrase was "exaggerated hyperbole" designed to attract attention.

Phister indicated the percentage of IBM moving-head disk drives on IBM CPUs in the U.S. declined from 93.8% in 1970 to 84.5% in 1972, thus reflecting incursions by PCMs.

On a broader basis, IBM-made spindles on IBM systems accounted for 79.4% in 1970 and 67% in 1972 of all spindles on all systems in the U.S., he said.

On the second day, Phister turned examiner and asked a question of Boies while being interrogated on whether the value of PCM gear and terminals was included in IDC's values of general-purpose systems.

Phister indicated he thought it was, but as IBM President John R. Opel and chief counsel Nicholas deB. Katzenbach looked on, Boies backed off from that line of questioning.

"I thought I was right, but you've shaken my confidence," Boies said, indicating he would check some background during the luncheon recess.

But Phister did some checking of his own, reaffirming through a telephone call to IDC that he was correct in his understanding of IDC's philosophy in valuing systems.

This set Boies somewhat aback when he asked Phister how he knew, and Phister indicated he'd talked with "Mr. Mertz" at IDC.

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Burroughs Adds Three Communications-Oriented CPUs

(Continued from Page 1)

B866-1 is a 1 mHz system with main memory up to 114,668 bytes; the B866-2 is a 2 mHz machine also with a main memory of 114,668 bytes; and the larger B876 which is a 2 mHz system that has memory capacity of 147,456 bytes.

Operate With DCPs, Gemcos

The communications CPUs operate with Burroughs Data Communications Processors (DCP) and can perform as switches or remote communications nodes in a network.

The systems can operate with a newly introduced Generalized Message Control System (Gemcos) which contains modules for communications functions that include network administration, audit and recovery, routing, concentration and network statistics.

Gemcos costs $4,000 on a one-time charge or $133/mo on a three-year lease and $128/mo on a five-year rental.

Gemcos runs with a store-and-forward message-switch software system designed to handle both on-line and delayed transmission applications. This switch software is designated B800MS and costs $20,000 on a one-time charge, $667/mo on a three-year lease and $640 on a five-year plan.

Gemcos operates with the earlier Burroughs Message Control System which in turn operates with the Master Control Program (MCP).

The MCP costs $2,500 on a one-time charge or $70/mo on a continuing charge basis.

Both the B870 and B860 are microprogrammed systems which use a group of microinstructions called interpreters that reside in an alterable control memory.

Multiple interpreters can be run on the systems and up to six programs written in different languages can be processed concurrently in the control memory, according to the spokesman.

Both RPG and Cobol are supported in the systems.

Two disk storage subsystems, ranging from a cartridge with 145-msec average access time up to a high-speed disk pack with 33.3-msec average access, are available with the three models. Other standard Burroughs tape, card, printer and CRT devices are compatible with the CPUs, he said.

The DCUs for the B870 and B860 can operate at speeds from 9,600 bit/sec up to 64 kbit/sec on broadband facilities.

The processors can also be used in data entry applications and as multistation key-to-disk systems which later transmit preprocessed data to central site, the spokesman indicated.

Burroughs B860

Burroughs remote job entry support is available as well as Hasp software that allows the B870 or B860 to operate as an IBM workstation in an IBM network, he added.

The RJE packages cost $1,260 on a one-time fee, $33/mo on a three-year lease or $31/mo on a five-year lease.

The systems operate within the Burroughs data communications architecture which utilizes Burroughs Data Link Control and is compatible with IBM's Synchronous Data Link Control, the spokesman said.

An entry-level B866-1 with a DCP, disk-cartridge subsystem, CRT console display and 64K of storage costs about $33,000 or "less than $1,000/mo," he noted.

A high-end system using the B876 with DCP, 98K of storage, CRT console, 4.6M-byte disk system and 250 line/min printer costs $75,000 or $2,300/mo. Both configuration prices are for hardware only.

First deliveries of the B866s are scheduled for the first quarter of 1977 with the B876 slated for third-quarter delivery.

DP Crime Not Waning, Victims Just Keeping Quiet

(Continued from Page 1)

keep strictly confidential records on losses experienced through such means, according to Nilson.

A bank will often reveal the write-off losses from five years back as evidence that such a crime ever occurred, he added.

The average computer "holdup" at a bank is about $100,000. "That's 10 times as great as robbery, but nobody at the bank knows about it until it's too late — there are no guns and no people present at the time of the crime," Nilson said.

And there is no agency in the world established to tell the public of computer fraud losses, he noted.

Computer fraud happens because it's done secretly and silently, Nilson said.

"A programmer could easily do it at the bank and nobody would know because there's no way to monitor such losses and the individuals responsible for the crime are not prosecuted in many cases. Unless you have proof, you can't confront the person," Nilson asserted.

Criminals Improving Techniques

While precautions to combat computer crime are becoming increasingly sophisticated, criminals are improving techniques to meet the challenge. Worse still, there are fears that organized crime is entering the lucrative field, according to Parker.

Working from the available documentation, Parker maintains white-collar workers were and are responsible for the overwhelming bulk of high-technology crime.

He said only four cases out of 430 involved organized crime, but agreed there is "whispering down the hallway" about a possible influx of crime syndicates into the predominately white-collar area.

Parker planned to testify at last week's hearing of the National Commission on Electronic Funds Transfer (EFT) in San Francisco that EFT systems, for example, are an ideal area for the involvement of organized crime.

Robert Bullock, superintendent of the Illinois Bureau of Investigation (IBI) admitted he has received tips that organized crime has an interest in the high-technology, big-money swindles.

Although Bullock said the IBI has "intelligence information" that organized crime wants a piece of the computer crime action because it is a fertile new field, he neither knows how common it is nor whether any incidents of such kind have occurred in Illinois.

Bullock indicated he didn't want to divulge any unsubstantiated information. "We're more interested in establishing the fact it exists," he said.

"It's a very practical and possible thing; it's not controllable," Bullock said, adding the IBI may look intensely at the situation if the magnitude warrants.

Bullock denied making a statement appearing in a Chicago newspaper that the crime syndicate has already scored financial hits through computer operations by opening a bank account, learning the bank's computer access code with the help of an insider and using portable equipment to transfer money into the account.

He did agree, however, that a crime syndicate would need key information, key people and sometimes sophisticated equipment to score hits on computer systems.

Computer crime "is something people should take a hard look at and systems should have every precaution for protection. And there should be a periodic evaluation of any system" containing information representing goods or money, Bullock said.

"It's a mistake to think the system will last forever," he added.

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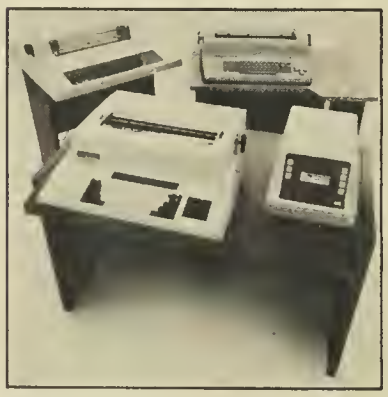

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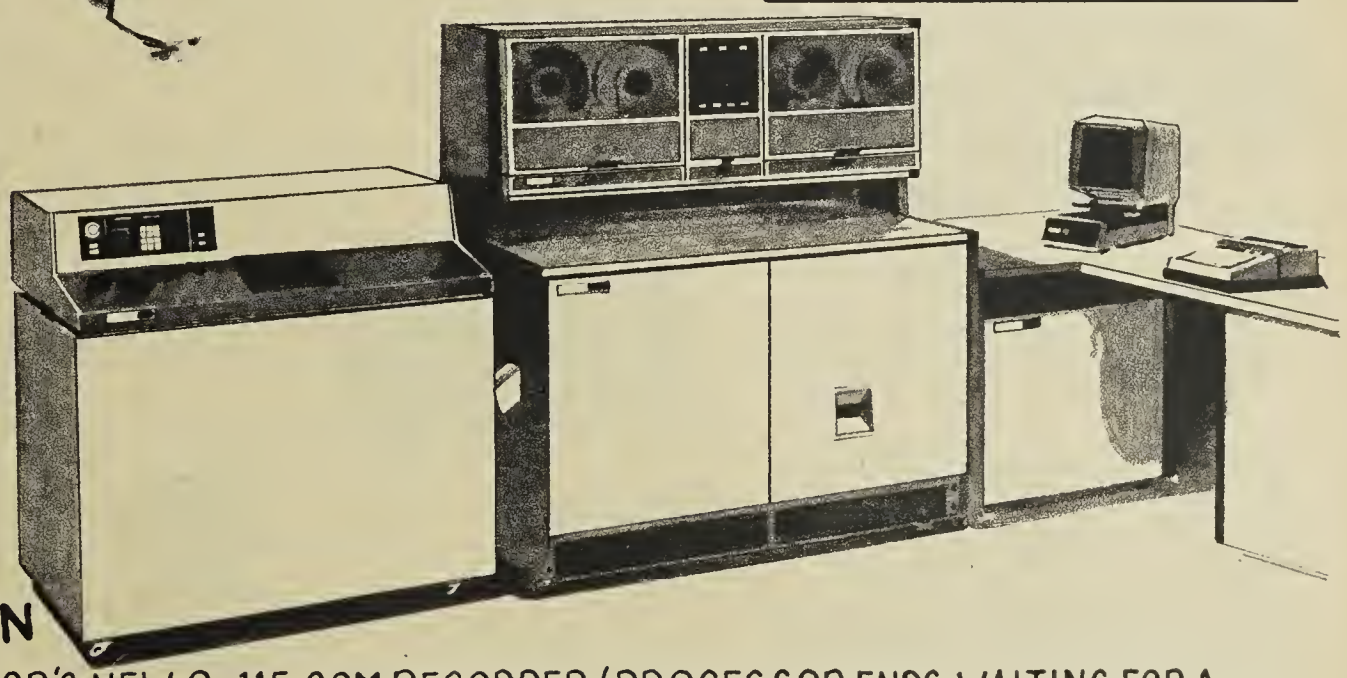

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Can't Tell Long-Term Effects

Glaser Urges Caution in Developing EFT

By E. Drake Lundell Jr.
Of the CW Staff

HANOVER, N.H. – The widespread use of electronic funds transfer (EFT) systems will have a great impact on society, but the long-term effects are hard to anticipate, George Glaser, an independent consultant, said at the Dartmouth College symposium on "Man and the Computer" here last week.

Acknowledging he was not as much "a doomsayer as some," Glaser nevertheless urged caution in the development of EFT systems.

A past president of the American Federation of Information Processing Societies, Glaser said a wide variety of EFT services and systems are being rushed out by an equally wide variety of organizations and interests with different ideas and motives.

"This is not a thoughtful process now," he indicated after surveying the competing interests in EFT development.

No Standardization

While there are currently no technological problems with EFT, there are problems of other kinds, Glaser said. One of them is a lack of standardization.

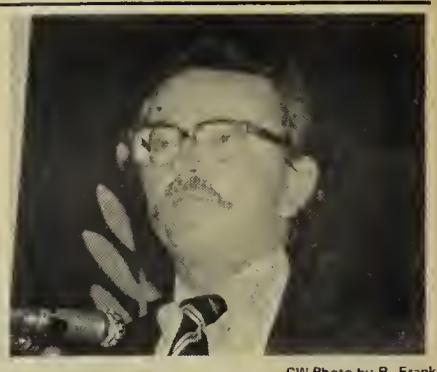
Many of the systems are being designed by regional and local groups who have developed no standards for the envisioned national hookup of the various systems.

Another problem confronting EFT is that of consumer acceptance, Glaser said, noting that recent studies have come down on both sides of this issue.

The economics of the systems are also not really well known, Glaser pointed out. Many competing firms and organizations are either in or planning to get into the field, which could lead to either an underestimation of the capacity needed for such systems or an overestimation of the needs, resulting in price cutting and possible havoc in the marketplace, he said.

The establishment of EFT systems, Glaser noted, is capital-intensive so there will be a need for high transaction levels in order to repay the investment. This may lead to further price cutting as competitors in the market try to reach those necessary transaction levels.

Legal, legislative and judicial opinion is "murky" on EFT applications, Glaser said. At present there is "a lot of noise" surrounding the issue, but no clearcut policy at any level of government.



CW Photo by R. Frank
George Glaser

The major questions that need to be answered about EFT, he said, are what is the role of the Federal government, to what extent the systems should be shared, what policy will produce the needed compromises between the competing interests, who is responsible for the systems and who will safeguard the systems.

These questions can be answered, Glaser indicated; he noted he personally is looking forward to the advent of EFT systems.

But, he said, people should have the option to use or not use the systems.

"I think we will get that option," he said.

Directory Under Way For DP Hobbyists

CAMBRIDGE, Mass. – A directory for computer hobbyists is being compiled to help subscribers keep in touch with each other and to provide information in an easy-to-find form.

The "Personal Computing Directory" data base will contain the name, address and telephone number of each subscriber. Clubs, societies, newspapers and magazines geared to the computer hobbyist will also be listed.

The directory, slated for publication in February, will also include manufacturers, stores, repair services, conventions, courses and contests – in short, almost anything of interest or of informational value to the hobbyist.

The data base is maintained on-line on a large mainframe capable of using either Fortran or PL/I.

The List Information Processing System (Lips) consists of a special-purpose editor for adding, deleting and changing items, three programs for typesetting and directory listings and one for printing mailing labels.

The directory will be divided into three parts, with addresses listed geographically by Zip Code, alphabetically and alphabetically by subject.

Listing and advertising in the 200 to 300 page directory is free. The directory will be sold for $4.95 from "Personal Computing Directory," Box 134, Harvard Sq., Cambridge, Mass. 02138.

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Calendar

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Jan. 10-12, Lake Buena Vista, Fla. — **OCR Users Association Winter Conference.** Contact: OCR Users Association, 10 Banta Place, Hackensack, N.J. 07601.

Jan. 10-12, Madison, Wis. — **Interfacing Instrumentation and Control Hardware to Minicomputers,** presented by the University of Wisconsin. Contact: James E. Nicholls, Department of Engineering, University of Wisconsin-Extension, 432 N. Lake St., Madison, Wis. 53706.

Jan. 16-19, Atlanta — **Bank Administration Institute's (BAI) Eighth National Conference on Bank Security.** Contact: The Meeting Services Division, BAI, P.O. Box 500, Park Ridge, Ill. 60068.

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Editorial

A Time to Reflect

There are just five days left before Christmas and, with the hustle and bustle of year-end reports piled on top of last-minute shopping, it is often easy to forget the true nature of the season that is upon us.

All major religions have a celebration around the time of the mid-winter solstice — be it Christmas, Chanukah or whatever. But most people, whether religious or not, cannot help feeling the holiday spirit.

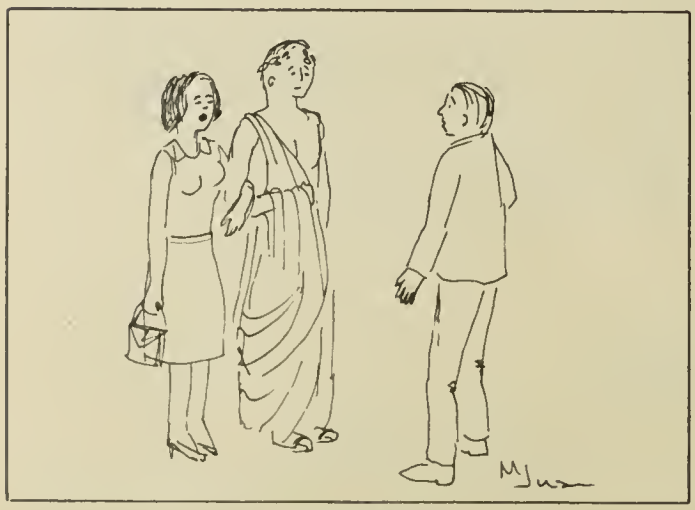
It is a time to reaffirm life even in the darkest days of winter. A time to reflect and rest for the year ahead.

Too often this is lost in the bustle of the season and in its commercialism. Christmas sales statistics are combed over by the economics profession for hints of recovery or depression in the economy, politicians use the occasion for the mouthing of platitudes and too many people worry just about the material aspects of the occasion and the upcoming football games.

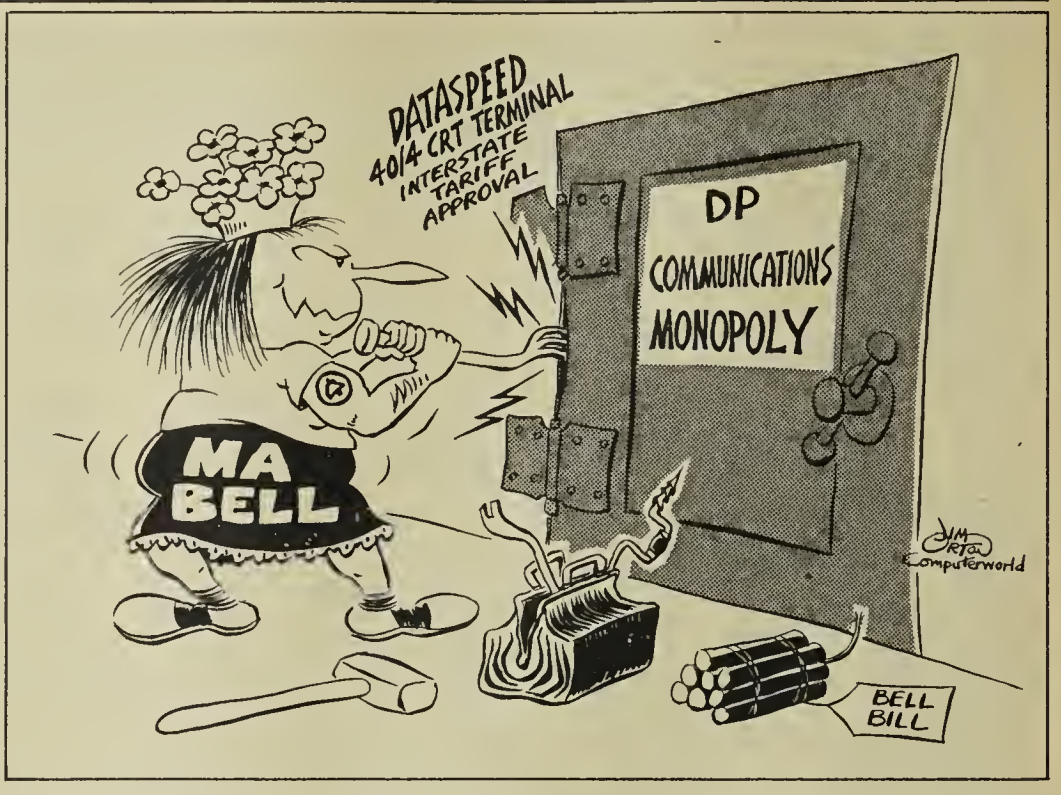
But we should all use this time to pause and reflect, to study ourselves and our lives.

Maybe that way we can carry some of the spirit of the season over into our professional and personal lives in the new year.

And in that way make it the best year ever. Season's greetings!



'He Is My Julian Date.'



Letters to the Editor

Fried Made Some Good Points And Then Ignored Them All

In his article, "Without Regulation, DP Professionalism Only a Myth" [CW, Dec. 6], Louis Fried made some very good points regarding DP "professionalism" and then proceeded to ignore them all by suggesting the creation of a new federal regulatory commission.

The "professions" he cited (medicine, law and athletics) each have their standards enforced by peer organizations, by contracts or by statutes — not by bureaucrats.

The sad history of the Washington alphabet soup (CAB, ICC, FDA, FTC, FCC, NLRB, DOT . . . ad nauseum) could hardly inspire one to expect an additional federal agency to produce anything more than the usual peddling of influence, protection of incompetence, stifling of innovation and restraint of competition which has cost the American consumer untold billions in the past.

I am tired of reading all the agonizing about whether DP is a "profession." Perhaps a discipline becomes a "profession" when its trade publications cease worrying about what the word means.

Professionalism is really nothing more than the responsibility for one's own work and for its consequences.

Federal agencies have hardly made positive contributions to the "professionalism" of the jobs they now regulate, such as truck drivers, insurance sellers, gun dealers, labor leaders, letter carriers, social workers or tea tasters. Perhaps this is because government itself is, by its very nature, unregulated.

Bruce A. Martin

Middle Island, N.Y.

Aspects of Professionalism

Professionalism means producing high-quality work. It also means being subject to a set of sanctions above one's employment situation, as Louis Fried noted.

Since this aspect of professionalism has eluded DPers as yet, perhaps another perspective on the topic is needed.

Professionalism also means the kind of work performed. My father (who was a minister) used to say that a professional is one who serves the basic needs of man. The doctor serves his physical needs, the lawyer his societal needs, the minister his spiritual needs and the educator his intellectual needs.

Where does the DPer fit in?

David Ibach

Northville, Mich.

Conversion Incorrectly Corrected

In his letter [CW, Dec. 6], Larry Kintisch used very clumsy Cobol. At issue is the conversion by M. Curtis Stordahl in his article [CW, Nov.15] on the PL/I "DO WHILE C" into Cobol.

The correct minimal conversion, according to the Cobol standards (both 1968 and 1974), is "DO NEST-4 UNTIL NOT C," where NEST-4 corresponds to the loop body.

The Kintisch form of "IF NOT C THEN PERFORM NEST-4 UNTIL NOT C" will probably work, but might create unnecessary extra code. The heart of the matter is that both Cobol and PL/1 use the "test first" form of the loop, in contrast to Fortran's historic use of the "test last" loop.

The best possible world would contain a "test where you want to" loop, such as Applied Data Research's Metacobol and the University of Toronto's Project Sue systems language provide.

Howard E. Tompkins

Indiana, Pa.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
Dec. 22, 1971

WASHINGTON, D.C. — The federal price commission ruled IBM could raise rental maintenance prices by up to 8% for almost all of its CPUs. The rates had been frozen under Phase I of President Nixon's price and wage freeze program.

— — —

WASHINGTON, D.C. — The Independent Data Communications Manufacturers Association (IDCMA) charged AT&T's Data Access Arrangement (DAA) "discriminated against customers providing their own modems and other [non-carrier] equipment."

Eight Years Ago
Dec. 25, 1968

ST. PAUL, Minn. — Control Data Corp. filed suit against IBM on antitrust grounds charging IBM had breached the Sherman Act both through actual and attempted monopolization of interstate and foreign computer markets and submarkets. The complaint asked treble damages for past violations of the Sherman Act as well as injunctive relief against continuing violations.

— — —

SAN FRANCISCO — The financial condition of the Association for Computing Machinery (ACM) worsened over the last five months, according to an ACM Council meeting here. The net worth of ACM, estimated in June at $70,000, was not provided this time, but the deficit was thought to be not greater than $120,000.

Regular Appraisal Needed to Check Value of Service

By Jack Stone
Special to Computerworld

There are many strategies which small users can employ to solicit the help of DP center management in solving their problems, but one of the most potent is that of persistence.

This approach is vividly illustrated in an interview I recently conducted with Robert Currie, director of evaluation/domestic programs for Action, the U.S. Federal government agency responsible for worldwide volunteer programs for social services.

The moral of this story is that DP managers should regularly appraise the services they render to all users to assure the validity of their DP operation.

Q: Bob, what has been the history of your involvement with federal volunteer programs?

A: I have been associated with volunteer programs for about eight years. Both Caroline, my wife, and I were Peace Corps volunteers. Along with our son, Robert, we spent 1964 to 1971 in the Philippines and Micronesia, working to train local public school teachers and to develop volunteer programs.

After this tour, I returned to become an independent consultant, specializing in social program evaluation. I then reentered government service in 1974 to take my current job.

Q: Can you briefly describe the nature of your department's task relative to Action's mission?

A: Surely. Within its responsibility for domestic program evaluation, my department makes assessments of the validity of and progress toward program goals and objectives, the impact of programs on the recipients of services and the program benefits compared with costs. It also makes recommendations to Action management regarding expansion and realignment of programs to improve performance.

Q: What DP services do you need in your department?

A: To support our evaluations, we perform certain statistical studies of volunteer activity and program performance. Information on volunteers is generated from the Action Domestic Operations Reporting System (Dors), which is controlled by the Action Computer Services Division. This division provides systems and programming services to all Action departments.

The volunteer file that we use contains biographical data, service dates, training history and associated project information. We have developed an independent file on program performance from our own personal questionnaires, field surveys and other sources.

Q: And when you first arrived at your department, what was the status of computer services support to user departments?

A: Well, let me first say that when I started in my current job, I had no prior experience or background with computer-based processing methods and, therefore, I could not judge the effectiveness or efficiency of DP services either for my department or for others. Also, the processing activity in my department was modest in scope; it simply consisted of manual analyses of various routine but lengthy information listings derived from the Dors.

Q: I assume that, shortly thereafter, your needs began to grow.

A: Most certainly. After I was onboard for only six months, we all learned the manual methods were too cumbersome, time-consuming and prone to human error.

I should note that a great help to us during this period was a three-day class on basic DP systems, presented by a training consultant.

When we felt knowledgeable enough to approach the DPers for support, we learned these people were almost totally engaged in operating and maintaining the Dors and other major systems and a third-generation computer was installed. Although they indicated they would try to do what they could, they stated that since we were a small user we would have to take a low priority in the total workload.

I thought it was wonderful that they would handle our problem at all since we were all just beginning in the business of using computers.

Unfortunately, after about four months, we terminated the efforts with the computer services people because our low priorities made the automation process no more efficient than our current manual processes.

Q: What did you do then?

A: Some friends of ours told us about the Statistical Programs for the Social Sciences (SPSS).

After we told our DPers about the package, they located a version that ran on the in-house machine. However, because of the priority problems, we couldn't get significant results after several months of their efforts. They finally suggested we transfer our tasks to a local government service bureau that could perhaps give us better support.

We went to this bureau, which had a very large and modern computer installation. We started receiving results in a couple of days.

Q: I guess that all is well now.

A: Oh, things are fine. We have since transferred our workload to a commercial service bureau which has certain special capabilities.

Oh yes, I should also mention that while we were running at the government service bureau, the Action in-house machine operations were terminated, the machines were discontinued, the in-house staff was reduced from 70 to about 40 people and the entire high-priority workload was transferred to outside service bureaus for processing.

The Human Connection

Confusing Percentages Surround Overbooking Problem

The Taylor Report
By
Alan Taylor, CDP

There appears to be an escalating war between the airlines as to which one has the best overbooking figures. It started in September when United Air Lines, in its *Mainliner* magazine, characterized the situation as follows:

"But how often is someone denied boarding? In United's case over the past 12 months, 16,545 out of 30,350,157 passengers boarded (or far less than 1%) were denied their reserved space for various reasons, including space planning" (which is United's euphemism for overbooking).

After toting the 1974 and 1975 figures together to claim "the lowest rate" of denied boardings in the entire U.S. scheduled airline industry, Allegheny Airlines went one better than the "far less than 1%" claim. In its November *Flighttime* magazine, Allegheny gave some parallel figures about overbooking and its own claim about what they showed:

"During the 12-month period, September 1975 to August 1976, Allegheny carried 10,829,582 passengers and denied boarding to only 5,034 – less than one-half percent."

Actually what the Allegheny figures did show, over and above the fact that apparently neither airline is keeping its decimal points straight when working out percentages, is that there has been a serious increase in the percentage rates of denied boarding.

While the 1974-75 figures were ".3 per 10,000 enplanements" and would anticipate 3,249 denied boardings for 10,852,582 enplaned passengers, the actual figure is 1,815 higher – a 55% increase. Apparently, this is not very satisfactory progress in learning how to avoid the denied boarding problem.

Actually, what is being developed here by both airlines is the concept that overbooking arguments can be settled by comparing the "total numbers of passengers enplaned" to the "total number of passengers denied their confirmed space." This is, of course, nonsense because it dilutes the figures by including passengers flown on nonoverbooked flights.

The apparent conclusion of Allegheny's figures (that denied boardings have jumped 55% in 1976) simply reflects an increase in overbooked flights rather than a decrease in the efficiency of the airlines' overbooking algorithms.

In this case, the problem arca (denied boarding) is blamed on the computers and so is our concern. Therefore, we have to do what we can to understand and ameliorate the real problem.

We need to distinguish denied boarding problems from the deliberate overbooking policy itself. Perhaps the best way to do this is to take a management viewpoint of deliberate overbooking and ascertain the benefits and the costs.

From the management's point of view, overbooking is beneficial because it increases revenue. United, for instance, reckoned the 1,559,062 passengers who were overbooked and then accommodated in 1974-75 contributed $99,233,296 to the airline at a rate of $63.65 per passenger. For the year ended June 30, it figured 842,637 passengers were overbooked and accommodated while 16,545 were denied boarding.

Benefit/cost analysis suggested 50 overbooked passengers were boarded for each passenger denied. A 50:1 ratio doesn't look bad from a management point of view unless there is something with which to compare it.

However, this ratio only authorizes the practice of overbooking; it does not suggest there is no way of further minimizing the problem of denied boardings. That requires a whole different study.

The denied boarding figures currently get little analysis that I know of, but what exists is not as comfortable as the 50:1 management overview. United, for example, was unable to get more than about one third of the denied passengers to their destinations with less than a two-hour delay (the current success/failure criterion of the airlines).

United said the "space planning program is continually being refined." However, a "failure" ratio of two out of three suggests denied bookings are occurring on flights when there are long delays (perhaps overnight) before alternatives and/or denied bookings are occurring on flights where there is strong demand.

In fact, while the practice of overbooking may well be justified by 50:1 figures, the separate problem of the 2:3 failure ratio when denied boarding occurs has simply not been addressed by the current spate of public information articles. Until it is, there is little that professionals can do other than speculate.

But we can speculate; and that may bring forth some better understanding of the problem and how it should be studied. So that is what I am inviting you to do – to speculate on how to study the denied boarding problem.

The accompanying questionnaire serves as a possible starting point and raises a few areas of fairly obvious concern. However, if you have other concerns, then this is where to raise them; they may be the key to a new way of thinking about denied bookings and other DP problems.

The Denied Space Problem

The denied space problem occurs when an airline can't seat a passenger after giving him confirmed seating because the overbooking algorithms overestimated the number of people who would either cancel before flight time or not show at flight time.

Currently, the algorithms are not published, but reportedly include travel patterns by day of week, season of year, routing of flight, past no-show experience and equipment being operated.

The past no-show data is a historical composite of reservation cancellations, no-shows and multiple reservations of flights and in markets of the same type.

(1) What other important factors can you see? _____

(2) What problems and potential misuses can you imagine in using travel pattern data of the type detailed above? _____

(3) What type of information about the overbooking algorithms would assist you in suggesting possible improvements for consideration by the airlines? _____

(4) Other comments _____

Name _____ Position _____

Address _____

City/State/Zip _____

After completion, please return to Alan Taylor, c/o Computerworld, *797 Washington St., Newton, Mass. 02160.*

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Productivity Management—Part 2

Naming Goals, Finding Staff Precedes Design Work

In the first half of this series [CW, Dec. 13], spokesmen for Keane Associates outlined the problems they encountered when they first tried to handle large-scale, fixed-cost software development projects. This article provides more details on their "productivity management" methodology, the approach they devised to counter those problems.

Special to Computerworld

BOSTON — The term "define the job" suggests the technical dimensions of a job to be accomplished. But in the parlance of Keane Associates, Inc.'s productivity management technique, it means much more.

It means defining the business and personal relationships within the task and facing up in detail — at the very start — to the expectations that each involved group has.

"Without the painful process of culling, quantifying, listing in layman's language and obtaining assent to the exact results of the effort, the project becomes like a football game in which no one knows the length of the field, the number of downs or what constitutes a penalty," Keane's Francis A. Frank stated.

"Without detailed attention to such 'unimportant' factors as who, in a conflict situation, will have ultimate decision-making authority, the system will bog down almost from the start from vested interests, misunderstandings and confusion," he said.

In a major contract involving a state government, a computer supplier and nine separate state agencies, the lack of job definition and an understanding by each party of what the job was intended to do in detail brought a multimillion dollar project to a virtual standstill.

Within 60 days, Keane personnel applied its detailed "define the job" principles to the project, and it proceeded smoothly from that point to completion on the original schedule — despite a four-month initial delay.

Every systems project manager will say: "Get me the right people, and the job will get done." But, according to the Keane methodology, no one ever gets the right people. More likely, the project will be done with the people on hand.

This is the right way to proceed, according to John F. Keane, the firm's president. Rather than getting the "right people," it is much easier and far more productive to "involve people rightly."

The management task then, is to assure the people on hand will be given a reasonable opportunity to succeed with their individual parts of the project. Since every major development involves at least 14 levels of jobs or functional titles and often hundreds of individuals, each of these must be made specifically aware of their role in the program and consent to it prior to initiation, Keane said.

To achieve this, he recommends massive simplification of each element of the project down to the individual's level. Since unsophisticated non-DP personnel, such as user departments or data entry staffs, are involved, all work descriptions must be prepared in layman's language and presented pictorially in easy-to-understand schedules or layouts.

By applying the well-defined skills of any systems designer — but at a detailed step-by-step procedural level — the problems of

(Continued on Page 14)

ICCP Seeks Questions for New Test

CHICAGO — The Institute for Certification of Computer Professionals (ICCP) has issued a call to "all segments of the DP community" for help in shaping an examination for senior programmers to be given for the first time late next October.

The examination "is aimed at identifying competence rather than excellence. It is not an elitist sort of thing," according to Dr. William Cotterman, who heads the ICCP committee charged with developing the new test.

Chairman of the Information Systems Department at Georgia State University, Cotterman said the examination will include content common to all senior programmers as well as specialized content appropriate for business, scientific and systems programmers respectively.

The new test complements the Certificate in Data Processing (CDP) examination which ICCP has sponsored for several years for DP managers, Cotterman noted. Although the announcement of the programmers' test said it will "round out" the ICCP's certification activities, "some sort of test" for systems analysts is still "being talked about," the professor said.

The broad outline for the programmers' test is "pretty well fixed" for the 1977 sitting, but suggestions and actual questions for possible inclusion in the examination are wanted as soon as possible, he said.

Among the areas to be included are data and file organization, principles and techniques of programming, programming languages and interaction with hardware and software.

'More Than Programming'

But "more than programming techniques" will be covered, Cotterman said, noting "interaction with people" and "those sorts of things a programmer has to know about his environment to be effective" will also be included.

"Environmental" questions, perhaps more than pure applications knowledge, will be the focus of the portion of the examination geared to either business, scientific or systems programmers.

All business programmers should know something, for example, about accounting. And the scientific programmer has to know things about his work — numerical methods, for instance — that a business-oriented worker "will never have to know," the professor said.

The plea for help "as soon as possible" is meant very seriously, he added. The committee's first item review is scheduled for Jan. 20, with others slated for February and March.

Anything received after that won't be considered until a second sitting for the exam has been planned, according to Cotterman.

The ICCP is at 35 East Wacker Drive, Chicago, Ill. 60601, but ideas and suggested questions for the new test should be sent to ICCP Programmers' Examination, 304 E. 45 St., New York, N.Y. 10017.

Output of 'CICS Dump Analyzer' Identifies On-Line Coding Ills

NEW YORK — Installations using IBM's Customer Information Control System (CICS) software may have an easier time diagnosing and, ultimately, solving program problems with the CICS Dump Analyzer package now available from Commercial Software, Inc.

Analyzer is said to take over the time-consuming but necessary interpretation of "raw" dump data and turn it into easily understood information more quickly than programmers could do if they attacked the problem manually.

Hexadecimal calculations, address chain searches and bit mask interpretations are among the tasks handled by the package, Commercial said. The system validates all system address pointers and all system queues and chains, a spokesman added.

Analyzer also interprets control blocks, reporting them to the user in both "Dsect" symbolics and their English descriptions.

It also reports all system-maintained statistics and interprets system bit masks in English, the company noted.

Perhaps more importantly, the CICS Dump Analyzer identifies the control program in which an Abend has occurred; it collects and prints together all control structures related to a given task, even though the data was originally dispersed, according to the spokesman.

The diagnostic software also provides sorted trace tables by task as well as English language "interpretations" of what entries on those tables mean. This includes notation of what command was issued, at what point and for what purpose, he said.

In addition to supporting the experienced programmer in resolving problems, the CICS Dump Analyzer may also serve as a training tool for novices. It would show the trainee a standard way to diagnose current problems and, hopefully, avoid a repetition of the coding errors in future work, Commercial explained.

The "standard" CICS Dump Analyzer — for DOS and OS shops — costs $165/mo while a VS version — for DOS/VS and OS/VS — is available for $175/mo, the vendor said from 420 Lexington Ave., New York, N.Y. 10017.

Applications Accepted

. The use of application packages from software houses and other outside sources has become a way of life in many — although certainly not all — installations. The "not-invented-here" syndrome seems to be dying.

But what's involved in the selection process and how well does the implementation go once a package has been picked? How good is vendor support and how does actual experience with a package compare with a user's expectations?

Are the horror stories of years ago still being repeated, or have both vendor and user matured enough to make the packages work?

These are some of the questions to be considered in a special *Computerworld* report on application packages in February. User comments and articles are welcome.

Contributions should be limited to 1,000 words, typed (double-spaced, please) and sent by Wednesday, Jan. 26 to Don Leavitt, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

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'Daft' Links Datapoint, Honeywell Units

SAN FRANCISCO — The Dispersed Automated File Transfer (Daft) package from The Data Stream is said to support the use of a Datapoint 5500 as the hub of its own data entry network and as a link between its substations and a Honeywell 6000 or Series 60/66 mainframe.

In effect, Daft mates the capabilities of Datapoint's Datashare environment and Honeywell's Gcos, The Data stream said.

Datashare supports up to 16 CRT-basd key stations, each of which can run a separate task under intelligent editing. Daft, on the other hand, allows one or all of the CRTs to sign on to the Honeywell system to utilize its capabilities at speeds up to 4,800 bit/sec, a spokesman claimed.

Honeywell-based operations permitted under this arrangement include remote job entry, remote batch and on-line transaction work under TSS, he noted.

Daft also supports the automatic transfer of specified files between the Datapoint and Honeywell systems. With this capability, operations on a given file can be performed in the most effective environment and the result will be available in both, he continued.

Print Spooling

Data compression, record blocking, restart capabilities and automatic job spawn and output retrieval are features of Daft. Print spooling using Honeywell's line printer and slew control is also performed with the package, he said.

A communications monitor maintains an internal log of all functions desired, along with record counts verified by the Honeywell job-accounting system. Daft operates under any version of Honeywell's Gcos and any version of Datapoint's disk operating system, The Data Stream added.

The Daft package, including several Honeywell resident modules, is available for $14,500 from the vendor at 950 Battery St., San Francisco, Calif. 94111.

Non-DPers Get Output With 'Superenglish'

ENGLEWOOD, Colo. — Non-DP-oriented personnel have now been offered yet another generalized criteria selection and report generating system. This one, called Superenglish, is available from Automated Quill, Inc. (AQI) and runs on Data General equipment.

Like a number of products already on the market, Superenglish accepts user-defined control parameters, searches a file for the desired records, selects them and sorts them into any required order and prints data from them according to user instructions.

Calculations listed by the user can be performed on file data elements either at selection time or as the report is being generated. Data elements to be used can be defined by the user or retrieved from existing files, AQI said.

Can Be Stored

Although designed especially to support the creation of one-time reports, Superenglish includes a facility for storing selection criteria, sort parameters and report formats to ease the creation of often used printouts, a spokesman noted.

The software system has been implemented to function in stand-alone mode with any Data General file or in conjunction with AQI's Mini-Miz, which is described as a "high performance on-line bookkeeping and accounting system" including a number of specific application modules.

Superenglish is available for a one-time license fee of $4,900; current Mini-Miz users may obtain a license for $1,900, AQI said from 3501 South Corona St., Englewood, Colo. 80110.

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HP CPUs Run in Dual Mode

LONG BEACH, Calif. — Sites running Hewlett-Packard Co. (HP) 2100 or 21MX systems under DOS-M or DOS-III can create dual-processor environments allowing up to four disk drives on each processor to be fully accessible to either at all times, according to Data Systems for Industry (DSI).

An addition to the HP operating systems, developed by DSI for manufacturing systems but now generalized for more universal application, supports the dual-processor access of either HP 7900 or 7905 drives, the independent said.

Contention problems normally arising in dual configurations are eliminated by exchanges of timing and control information between the two systems.

The DSI software costs $4,750 and is available now on magnetic tape from DSI at 3450 E. Spring St., Long Beach, Calif. 90806.

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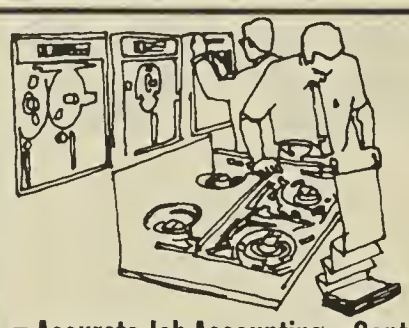

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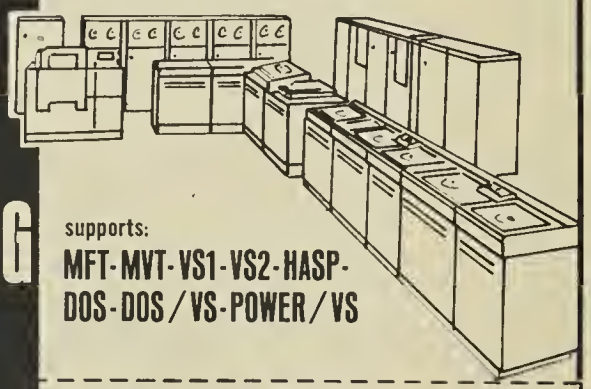

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Goals, Staff, Then Design Work Seen as More Productive Order

(Continued from Page 12)

assembling, motivating, directing and encouraging success among a project team are greatly alleviated.

The third step — estimating time and cost — comes after the job has been defined and the full team assembled and directed. "Is it realistic," John Keane asked, "to expect that a major systems project can be costed and estimated before these two steps are completed?"

Yet, he indicated, an enormous number of software projects do just that, making true control difficult right from the start.

Keane advocates fixing only those time and cost elements that can be fixed and avoiding "premature precision" on those that must rely on "best guess" accuracy.

By being prematurely precise, the manager converts what should be two of his most effective management tools — time and dollar resources — into his worst problems. And it makes introduction of the newest innovations or improved designs almost impossible without cost-time risk during the project's life.

Approximately 75% of any system development effort can be firmly costed; the remaining 25% will involve either design changes or failure-to-comply issues for which budgeting should not be fixed.

In addition, a special "overage" funds/staffing pool should be factored into each project to allow for both desirable and necessary changes of scope during the project's life.

The 80-Hour Rule

Probably the core precept of ongoing control within productivity management is the fourth principle: the approach Keane calls the "80-Hour Rule."

In essence, the rule states that no single task in a project can take longer than 80 hours — or two man-weeks — from start to finish. In other words, a total systems project, regardless of its size or complexity, must be broken down into work units that can begin and end within 80 hours.

This rule assures four fundamental management tools are always operable. The first is measurement — either a task is finished or it's not in a two-week span. The second is motivation; by meeting two-week targets repeatedly, team members learn to win and succeed.

The third tool is problem isolation; if the two-week finish isn't met, identification of the nature and reason for the problem can be made immediately. The fourth is accountability; each team member knows what he must do, the time frame in which it must be done and the relationship of his performance to the progress of the total project.

Changing Project's Scope

Most systems managers would consider encouraging the change of a project's scope a disastrous concept. But productivity management recognizes two truisms: first, that a major project can never be implemented within a rigid, unchanging structure; and second, that many excellent and innovative changes are bound to be suggested as team members get deeper into project implementation.

Thus, a system for identifying proposed changes of scope, for reviewing such changes and for measuring in advance their potential impact, both good and bad, becomes as much a part of the development task as systems design or functional specifications. It is integral to the success of the project.

The final precept of productivity management is to establish criteria for acceptance of the system. Traditionally, this is often done after the time and dollars for the project have been expended.

"That's a little like jumping off a cliff to get to the bottom, rather than carving a series of steps that lets you get there a stage at a time," Frank explained.

Keane's approach is to use a series of "Authorizations to Proceed" — formal documents on which all appropriate personnel must sign off before the next step can be taken. Without such written authorizations, implementors proceed at their own risk.

Thus, carefully staged series of authorizations, based upon measurable progress which is easy for all to understand and accept, assures that, when it is time to accept the finished system, management and user departments are in effect accepting only the final 4% to 5% of the effort, rather than 100%.

And problems that might occur become minimal, rather than massive, "because acceptance has taken place in a continuum since the project's start."

Beyond these six operating principles, productivity management represents a total environmental evolution, a way of thinking about, planning for and managing major intricate systems projects — even those that do not involve computers.

"We see it as an effort to deal with the newest frontiers of modern organization — the need to achieve goals while fulfilling the expectations of all of the individuals who participate in the process of attaining and who enjoy the benefits of using modern organizational capabilities," John F. Keane said in summing up.

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Want to know how other datacomm users and consultants solve problems? Come to DataComm 77, Sheraton Park Hotel, Washington, D.C., March 9-11, 1977. Leading users will be on hand to brief you on ways they put datacomm to work. Here are some of the speakers:

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In Intracompany Transmissions

Combined Services Seen Key to Cost-Effective Future

By Ronald A. Frank
Of the CW Staff

HILTON HEAD, S.C. — Communications services will be cost-effective to users if they combine voice, data and graphics capabilities — at least as far as intracompany needs are concerned. This opinion was voiced by Archie J. McGill, director of marketing management at AT&T, and John M. Galvin, executive vice-president at Aetna Life & Casualty Co.

The two speakers took part in a discussion of new communications facilities at a conference sponsored by International Data Corp. on distributed DP here recently. Galvin described implementation plans for Satellite Business Systems (SBS) in which Aetna is a partner with IBM and Comsat General Corp.

Predicting SBS will be ready to install its first earth station at a user site in late 1979 or in 1980, Galvin said earth stations are now projected to cost in the "low hundred thousand dollar" range; the cost will be borne by SBS, he added.

Users will be charged on the amount of data being transmitted and the sites connected to the satellite network, he said.

Initially the SBS service will be limited to intracompany applications. Intercompany usage will be added later depending on regulatory and other constraints, Galvin said.

The SBS service will handle users with both voice and data needs with an integrated type of offering which might include all-digital image processing as well, he said.

McGill, speaking for AT&T, did not talk in terms of specific services, but agreed the information systems manager of tomorrow will be looking for a "systems approach to information handling with all information regarded as a corporate resource." This would include integrating voice, data and image communications, he said.

The trade-off on centralized vs. decentralized processing can no longer be tied to the way in which data is handled since information can now be "manipulated at the source, centrally or both," McGill told conference attendees.

The communications vendor can no longer be part of the problem — instead, it has to be part of the solution, offering users a total systems-oriented service, he said.

CW Photos by R. Frank

Galvin | McGill | Roberts

Much of the processing which is being distributed is designed to facilitate communications. It is this communications processing that may reside at various points in the system architecture including centralized hosts, communication nodes or other points, he said.

Representing the packet-switched approach was Lawrence G. Roberts, president of Telenet Communications Corp., who said some users of his firm's network now connect up to five CPUs, each operating with its own software.

If international connections are made among packet-switched nets as proposed, international resource sharing will become possible, he said.

One problem with such interconnections is that some countries do not want to handle third-party traffic bound from one country to another. This may require common interconnections among all countries in a network, he said.

Current costs for the 100 users' hosts on Telenet are about $2.75/hour when all speeds are averaged. This is about 1 cent to send a page of copy compared with about 12 cents to send a page by facsimile transmission, he said.

Efforts now under way to standardize the X.25 protocol will mean otherwise noncompatible terminals will interface with packet nets. One of the benefits of this standard is that it will allow multiple access to multiple CPUs, he said.

Presenting the Federal Communications Commission (FCC) point of view was Dale N. Hatfield, chief of the commission's Office of Plans and Policy, who reviewed current issues now pending before his agency.

(Continued on Page 16)

Lessor Has Network Management System

HARTSDALE, N.Y. — DPF, Inc. has introduced an integrated hardware/software network management system designed to reduce CPU overhead by providing multilevel telecommunications functions for users with on-site IBM CPUs.

Flexicom is composed of an additional IBM 360 or 370 CPU and a recently updated subset of Task/Master II telecommunications monitor software from Turnkey Systems, Inc.

Task/Master is tuned to front-end and remote processing functions, according to a DPF spokesman.

The Flexicom hardware/software package handles network statistics, polling, message queuing and routing and resource management functions, he said. It can also be configured to handle some applications processing offloaded from a user's present CPU, which acts as a host to the Flexicom system.

Working as a front-end processor, Flexicom can communicate with the host at channel speeds with the addition of a channel-to-channel adapter, the spokesman noted.

The basic system consists of and is based on an IBM 360/30. In the front-end processor mode, Flexicom is placed between the user's CPU and an IBM 3705- or 270X-type transmission control unit (TCU).

As a simplex distributed processor, Flexicom provides more local processing capability, the third-party lessor said. The package is linked to the host CPU via telephone lines from a remote location, the spokesman added.

In local mode, Flexicom could allow a regional DP center to run local applications, switch messages and communicate to the host only on a demand basis, DPF noted.

As a multinode distributed processor, the package exists as a communications processor at not only the host site, but also at remote sites connected to the master site via telephone lines, the company added.

Flexicom also includes automatic restart and error recovery to resume processing after a system failure; it can reportedly provide support for about 40 different types of terminals of unlimited number.

The package is compatible with IBM hardware and software and therefore requires minimal programming for integration into the user's environment, DPF said.

In addition, application programs can be written at each level of the network in the higher level languages, DPF claimed.

The leasing company is offering versions of the package based on 360 or 370 mainframes depending on user processing requirements. The options available include IBM or IBM-compatible hardware including the TCU, I/O set and peripherals such as printers or card readers, according to the spokesman.

Maintenance could be provided by IBM, vendors of the IBM-compatible products utilized or by a third-party maintenance firm, he said.

A basic Flexicom based on a 256K IBM 360/30 with 30M bytes of disk storage, software support, installation and maintenance costs $6,000/mo on a five-year lease.

The same system could be purchased for less than $250,000, according to the spokesman, who added there is a wide range of system possibilities and costs.

DPF is located at 141 Central Park Ave. South, Hartsdale, N.Y. 10530.

Corrections

The New York City Police Department's terminal network [CW, Dec. 13] accesses the New York State Police Inquiry Network CPU supporting AT&T Dataspeed 40 terminals through one 2,400 bit/sec dedicated CPU-to-CPU link. And the Action Communications Systems, Inc. telecontroller acts as a front end for the department's dual IBM 370/158s.

The correct address of Trivex, Inc. [CW, Nov.22] is 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

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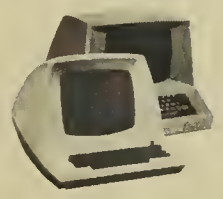

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Vendor Cooperation Saving $10,000/Mo for Net User

By John P. Hebert
Of the CW Staff

NEW YORK — A large Japanese trading firm is saving $10,000/mo in computer usage charges and has upgraded the transmission capabilities of its international link through international carriers' efforts and a dedicated communications facility.

For three to four years, Marubeni Corp. paid ITT World Communications, Inc. here about $15,000/mo in usage charges alone to handle the major node in its computerized message-switching system, according to a user spokesman.

Marubeni used ITT's shared-user Automatic Message Exchange switching system to handle merchandise trading information coming from 54 terminals in Tokyo over as many 75 bit/sec circuits costing $275 each in ITT computer termination usage charges, he said.

Dissatisfied with that method and burdened by a substantial growth in message traffic which is expected to double by 1981, Marubeni sought the advice of both ITT and Kokusai Denshin Denwa (KDD), Japan's international communications carrier. It wanted to help reduce costs and speed thousands of messages that funnel daily through the firm's 20 domestic and 175 overseas offices and subsidiaries.

The two international carriers got together and developed a common protocol which would allow their centers to communicate with equipment of different design and speed.

Based on Dual Minis

The Message Link Control protocol was implemented in a Digital Equipment Corp. system on Incotel Ltd. proprietary software. Incotel provided ITT with the DEC system on a turnkey basis, according to Marty Weisbart, the ITT engineer responsible for the Marubeni project.

The trading firm purchased dual DEC PDP-11/40 CPUs from ITT. The system was outfitted with DEC RK05 disks, a DEC DU11 medium-speed synchronous line interface, a DEC DC08 low-speed interface, a line printer, paper tape reader/punch and NCR Teletype-compatible, 150 bit/sec supervisory terminals to monitor and route traffic.

The dual CPUs allow trading information to flow between the Tokyo center's "roomful" of Teletype Model 40 CRTs and New York at 2,400 bit/sec speeds, Weisbart said.

ITT's Transpac II ground cable is the transmission medium across the Pacific to San Francisco. Another cable between the West Coast and New York brings an estimated 6,600 messages each day to and from the ITT center here in biplexed 2,400 bit/sec streams, Weisbart said.

Codex Corp. 4,800 bit/sec modems handle the biplexed data streams for input through the DU11 interface to the PDP-11/40s.

The DEC minis can store up to 10,000 messages of varying lengths up to 10,000 characters and send them out through the DC08 interface to 31 lines serving Marubeni teletypewriter terminals in the Western hemisphere operating at different speeds up to 75 bit/sec, according to Weisbart.

And a Spectron Corp. Datascope CRT was an "invaluable help" in establishing the medium-speed link because of its line diagnosis functions.

Marubeni's third center in Brussels, presently maintained by ITT/World, will be upgraded to replace 16 or 18 of the typical 75 bit/sec international lines with one line carrying data at the 2,400 bit/sec speed, Weisbart said.

The Eurotech subsidiary of Cable and Wireless Ltd. will take over operation of the Brussels center early next year to complete Marubeni's Benimex II worldwide message exchange system network, he added.

Because of lower traffic to points in Europe, however, the Brussels center will not have the same modern equipment as its New York and Tokyo counterparts and will not receive message transmissions directly from Tokyo.

Rather, data will be transmitted through the established Tokyo-to-New York link, even for messages originating in New York, Weisbart said.

Portable Analyzer Tests Nets, Equipment

STAMFORD, Conn. — The DA-404 portable data analyzer from the Stelma Telecommunications subsidiary of Dataproducts Corp. is a battery or ac-operated test set for troubleshooting communications networks and equipment.

Used in conjunction with a test pattern generator, the data analyzer reportedly gives a field technician the capability to install, troubleshoot and test data or telegraph systems.

The analyzer measures and indicates the type and magnitude of distortion present in asynchronous data and telegraph signals, Dataproducts said. It also detects the presence of parity errors in IBM 7-level or Ascii 8-level signals, a spokesman added.

The DA-404 has LED display; while indicating end or bias distortion, it simultaneously indicates the total peak distortion present in the signal, he said.

The unit provides any of four user-specified bit rates from 37.5- to 1,200 bit/sec.

The DA-404 costs about $690. A portable pattern generator, the PG-404, is available for use with the DA-404 and is also priced at about $690, Dataproducts said from 17 Amelia Place, Stamford, Conn. 06902.

Combined Services Seen Future Key

(Continued from Page 15)

Commenting on the Consumer Communications Reform Act, Hatfield said it would result in the dependency of American consumers "upon the discretion of a sole-source monopolist for the availability, diversity and quality of their communications services."

In its wording on jurisdiction over terminal equipment, Hatfield said that the bill could be interpreted as applying to mainframes.

It would be difficult if not virtually impossible to establish a nationwide network using specialized terminal equipment under provisions outlined in the bill, Hatfield said.

Addressing the argument from the telephone industry that competition will lead to increased rates for residential users, Hatfield said a recent economic study by the FCC staff had shown "the opposite may be the case."

Even if the argument is correct, however, there are "adequate remedies available" to maintain current residential rate levels and also have competition, he said.

Local-Loop Data Sets Run at 9,600 Bit/Sec

ESCONDIDO, Calif. — Designed Enclosures, Inc. (DEI) has introduced local-loop asynchronous data sets capable of 9,600 bit/sec operation.

The Asynchronous Data Transceiver (ADT) Models I and II are suited for low-, medium- and high-speed asynchronous data distribution over local loop metallic cable pairs, DEI said.

The data sets can operate at distances up to 20 miles and include internal diagnostics, loopback test functions and transmission line protection, according to the firm.

Prices for the ADT I and II start at $175, DEI said from 563 N. Citracado Parkway, Escondido, Calif. 92025.

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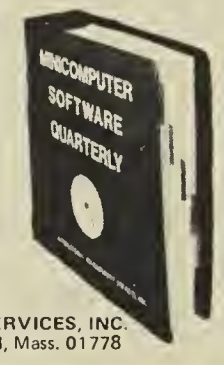

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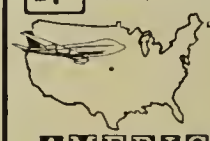

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Memorex, Graham Hike Prices of Magnetic Tape

Two suppliers of magnetic tape have increased their prices.

Memorex Corp. raised prices by 15% on its standard line of 600-, 1,200- and 2,400-ft computer tapes.

The hike, effective Jan.1, reflects the increased cost of materials used in the production of the tape, a spokesman for the Santa Clara, Calif., vendor said.

Graham has hiked prices 10% to 16%, a spokesman said from Graham, Texas 76046.

Tektronix 4051 Users Organize

BERKELEY, Calif. — An independent group of Tektronix 4051 graphics systems users has been formed to "provide an active forum where users can exchange information relative to the entire spectrum of the 4051 computing environment," according to a spokesman.

The group intends to establish a software and hardware information exchange as well as committees devoted to applications development, vendor liaison and professional recognition, he added.

Information is available from Vic Kley, P.O. Box 2117, Berkeley, Calif. 94702.

Bar Code Printer Offered

MOUNTLAKE TERRACE, Wash. — A two-hammer bar code printer that is said to print an alphanumeric bar code plus an independent line of descriptive text is available from Interface Mechanisms.

With the Model 8130 printer, a human- and machine-readable bar code label or tag is available at the point of use, a spokesman added.

Designed to fulfill the data-handling requirements of industrial inventory control, libraries and hospitals, the Model 8130 prints on a continuous roll self-adhesive paper labels or perforated tags. It uses a dry carbon ribbon to produce bar codes "with high optical contrast and sharply defined edges," the company said.

The printer has a typewriter-style, full alphanumeric keyboard. Suitable for random, batch or sequential label runs, the serial impact printer uses Ascii I/O.

The Model 8130 with keyboard and display costs $7,487. Interface Mechanisms is at 5503 232nd St. S.W., Mountlake Terrace, Wash. 98043.

Printer Line Counter Bows

CLEVELAND — Computer Resources, Inc. (CRI) has a computer printer line counter for use in ribbon management programs.

The counter features a presettable function which alerts the user when the printer reaches any user-determined level without causing the counter to lose the job count, CRI said.

The line counter costs $279 from CRI at 4650 W.160 St., Cleveland, Ohio 44135.

Xerox Cuts Printer Sale Price

EL SEGUNDO, Calif. — The purchase price of the Xerox 1200 Model 1 printing system has been reduced from $145,000 to $125,000 and new rental pricing plans and use charges for the system in the U.S. were announced by the company.

The effect of the new rental and use prices will be to increase charges for many customers approximately 5% to 9% and to lower charges up to 11% for customers with high work volume who rent two or more units, according to a spokesman.

The price changes were effective Dec.1 for new business. Effective dates for current customers will depend on the renewal dates of their agreements, he added.

Saving $2.5 Million/Year

System Brings 'Miracle' to Maryland

GLEN BURNIE, Md. — Computerization of the Motor Vehicle Administration (MVA) here has allowed the State of Maryland to save an estimated $2.5 million annually, according to Ejner J. Johnson, MVA administrator.

The MVA uses Control Data Corp. mainframes to keep track of over two million licensed drivers and two million more registered vehicles in the state.

The administration is in on-line contact with its 13 divisions while maintaining communications with various state and local law enforcement agencies via a software system called Miracle for Management Information Retrieval for Action and Communication With Law Enforcement.

Information on driver licenses, driver records, vehicle registration and tags, ticket accounting and related departmental data is available through a pair of CDC 3500 systems supplemented by 30 CDC 844 disk storage files.

Data entry and retrieval is mostly key-to-disk, with magnetic tape used primarily for backup and off-line printing jobs, Johnson said. The old batch-oriented system required all transactions to be updated on tape; changes were then siphoned off for subsequent file updates and retrieval purposes.

The old system gave comparatively slow turnaround from input transactions to retrieval; it also required the name and address of a person, corporation or other organization to be listed redundantly in each of several system records, he noted.

The Maryland Motor Vehicle Administration processes more than 7,500 record changes each day on its two systems.

Eliminating this redundancy is a highlight of the Miracle system, Johnson said. It is based on "marrying" files so all information pertaining to an individual for driver licenses, history, vehicles and various departmental actions is available from one name and address record file.

Under the old system, an individual with a driver's license who owned three vehicles appeared four times in the tape and memory files and his name and address was repeated in each. The Miracle system contains this person's name and address only once and all information pertaining to him is cross-referenced to the single name and address entry.

The use of a soundex identifier for coding driver license information has aided the implementation of this file marriage, Johnson said. The soundex formula codes a driver's last, first and middle names with his month and day of birth by means of a 13-digit identifier.

Soundex has a capacity of nearly 18 million separate entries, allowing almost unlimited possibilities for expansion, he added. The last character is flexible to permit separate entries for two persons with identical names and similar birth months and days.

Some idea of the storage saving that results from file marriage is the example of a large Maryland utility with more than 3,000 vehicles registered in the state. Previously, its name had been repeated over 3,000 times in tape and memory files, representing nearly 350,000 characters of memory storage.

Under the Miracle system, a single name and address entry for all vehicles reduces character storage requirements from nearly 350,000 to 100.

Rapid Transmission

"Another advantage of the file marriage," John B. Burke, technical manager, said, "is that it aids rapid transmission of management information and speeds communications."

Installed at MVA headquarters, branch offices throughout the state, law enforcement agencies and the Baltimore District Court, a system of more than 199 CRT and printer terminals permits quick information.

The success of the MVA's computer center operations hinges upon rapid processing of thousands of daily transactions to keep driver and vehicle files continuously up to date. Each year the center produces and processes more than one million driver license renewal applications and issues over one million licenses.

It is also responsible for the issuance of over two million vehicle registrations and produces nearly 800,000 vehicle titles.

The administration has estimated that, based on increases of as much as three times in the volume of its transactions during the past 10 to 15 years and an expectation that this trend will continue, failure to computerize its activities would have required doubling existing MVA facilities and the expenditure of millions of dollars.

CMC Designs Data Entry System For Distributed DP Environment

LOS ANGELES — The XL40 from CMC, a division of Pertec Computer Corp., is a distributed Keyprocessing system said to combine data retrieval, entry and management.

Software for the system allows data to be entered at the source and be validated at the entry point, according to a spokesman.

Data entry and report-writing capabilities are provided via a subset of Ansi Cobol which has been extended to include terms unique to distributed key-entry processing, CMC said.

Hardware for the system includes a microprocessor-based CPU. Up to 128K bytes of MOS random-access memory can be addressed, the spokesman said.

The unit can accommodate up to four tape drives, four disk drives, seven keystations, a card reader and a printer, he added.

The XL40 uses the Cobol Shared Access Method (Cosam) retrieval package which, by using indexed files, allows an operator to retrieve and update a file, CMC noted.

Communications on the XL40 include IBM 2770, 2780, 3780 and Hasp 360/20 workstation protocols.

In addition, the system includes the XL/OS operation system for foreground and background control of processing. Data entry, editing and monitoring of system operations occur in foreground while multiple job streams are processed in background, the company explained.

The system can support up to seven keystations. Users can opt for either keypunch-style or typewriter-style keyboards with numeric pads. Disk capacity is expandable from 4.4M- to 35.2M bytes.

An XL40 with five keypunch-type keyboards and 4.4M bytes of disk leases for $975/mo or can be purchased for $32,200.

CMC is at 12910 Culver Blvd., Los Angeles, Calif. 90066.

DASF Lets IBM 115, 125 Users Increase On-Line Disk Storage

By Esther Surden
Of the CW Staff

WHITE PLAINS, N.Y. — The IBM 370/115-2 and 370/125-2 will soon be able to accommodate up to 1.8G- and 2.3G bytes of on-line disk storage respectively through attachment of 3344 disk drives, according to an IBM spokesman.

Model 115-2 and 125-2 systems can be upgraded in the field by attaching the 9317 Direct Access Storage Facility (DASF).

The DASF for the 115-2 costs $83/mo on the Monthly Availability Charge (MAC) or $2,055 to purchase; it costs $84/mo MAC or $2,055 for the 125-2.

Previously the 115 could accommodate only 560M bytes of on-line storage while the 125 could store 1.12M bytes. The capability effectively triples the amount of on-line storage that can be accommodated by the 115 while doubling that of the 125, the spokesman said.

Units That Attach

The 3344 Models B2 and B2F are two-drive units that attach to a standard 3340 Model 2A. The 3340 connects to the systems direct disk attachment.

Up to three 3344 units can be linked to each 3340 Model AS2, and users may intermix 3340 and 3344 standard and fixed-head models, the spokesman noted.

The 3344 can accommodate about 280M byte/drive.

The 3344 B2 rents for $1,351/mo and costs $49,500 to purchase; the B2F costs $1,774/mo or $65,000. The capability will be available in September.

User Survey—Part 1

Study Highlights Four Areas of Distributed Processing

This is the first article in a two-part series dealing with distributed data entry. This article covers data entry and editing techniques.

By William J. Moore
Special to Computerworld

To supplement our experience in the basic elements of the distributed processing arena, Inforex, Inc., together with an independent consultant, conducted a study of the distributed processing plans and requirements of 50 major computer users throughout the country.

The result of the study was a working hypothesis — a definition of a rapidly developing arena at a particular point in time.

The study drew four major conclusions:

- Every user studied will distribute his DP operations. Many had plans under way.
- Each operator at each remote site would spend as much as 90% of his time entering data.
- Users planned little if any remote batch processing. Instead, they wanted record-by-record processing — the ability to manipulate or verify data as that data is entered.
- Users agreed the service and support any distributed processing equipment vendor is able to provide is a major factor in evaluating vendors. They said support is critical because equipment will often be installed in remote locations and operated by persons without specialized training.

Two Major Concerns

The 50 users studied had two major concerns: the timeliness of data and the validity of data. Those concerns were tied closely to two major expectations: cost reduction and the ability to provide better service to customers.

The users anticipated the cost reductions which come with improved control over any operation. They anticipated that accurate, timely information derived from a distributed system would enable them to respond more quickly and to better allocate production or other corporate resources.

With those concerns and expectations in mind, Inforex defined the distributed processing arena as consisting of four basic elements: data entry, data editing, file management and communications. Each basic element has implications for hardware, software and the human engineering factors which can sometimes be overlooked.

Trend Toward Decentralization

Data entry, like other aspects of DP, is becoming increasingly decentralized. As part of that trend, users have come to expect more data manipulation capabilities, in general, and more data validation capabilities, in particular, from their data entry systems.

Six specific data entry features are important to users who require timely, valid data whether at central or remote sites. These features are cursor control, field definitions, audit logs, error control, easy reset and insert/delete.

Languages

Unfortunately, many distributed processing systems vendors have overlooked these capabilities or have minimized their importance by requiring that each be programmed by users — typically, in the vendor's own language.

Large users certainly have the necessary programming skills, but all six features have been provided in centralized data entry systems and it should not be necessary for users to reinvent the wheel when configuring distributed systems.

Data entry will be facilitated if distributed processing systems are easy to set up; that is, if separate programs are not required each time a user wants to perform a simple application. A set of macroinstructions for use in defining fields, check digits and the like would sharply reduce user programming time.

Use of Remote Terminals

Remote terminals will likely be used in a variety of applications each day. Efficient data entry, therefore, requires easy sign-on and sign-off procedures. Audit logs and other error control features — audible signals and error messages — should be provided as standard data entry features, with no user programming required.

The record and character insert/delete capabilities should also be standard since 90% of each operator's time will be spent on data entry. Even experienced operators can omit data, mistype an entry or omit an entire document.

Features such as character and record insert/delete are necessary, the users indicated, if valid data is to be supplied in a timely manner.

The users also stated distributed processing systems vendors should be responsible for providing packaged data entry functions, but vendors should also aid users' applications programming efforts by providing powerful, industry-standard programming languages. Such languages are widely known and, therefore, easier to maintain at remote locations.

The study indicated an interactive language able to provide both interactive and batch communications is the real requirement.

Awareness of Alternatives

The importance of programming languages reflects a growing awareness among users of the wide range of alternatives available to them. Users with centralized data entry operations, for example, came to expect editing and calculating capabilities as well as entry capabilities a long time ago.

Similarly, users are aware of the capabilities of industry standard languages and should expect to use those capabilities in distributed systems.

And whatever language or set of languages a user selects, he should be able to mix them, keying an application in one language, for example, while using another for some special purpose at the same time.

Mixed Capability

That mixing capability presumes two other capabilities: concurrency, or the ability to do a number of different types of jobs at the same time, and multitasking, in which each terminal on the system can be used to perform a different task.

The study confirmed Inforex's experience with user software requirements for distributed systems. Down-line loading is important, for example, because it allows a central site to retain control of a network.

Network passthrough, in which an inquiry made from a remote site is automatically routed through other remote data bases and, ultimately, to a central data base is also important.

Moore is vice-president of domestic operations at Inforex, Inc. in Burlington, Mass.

JUST PUBLISHED!

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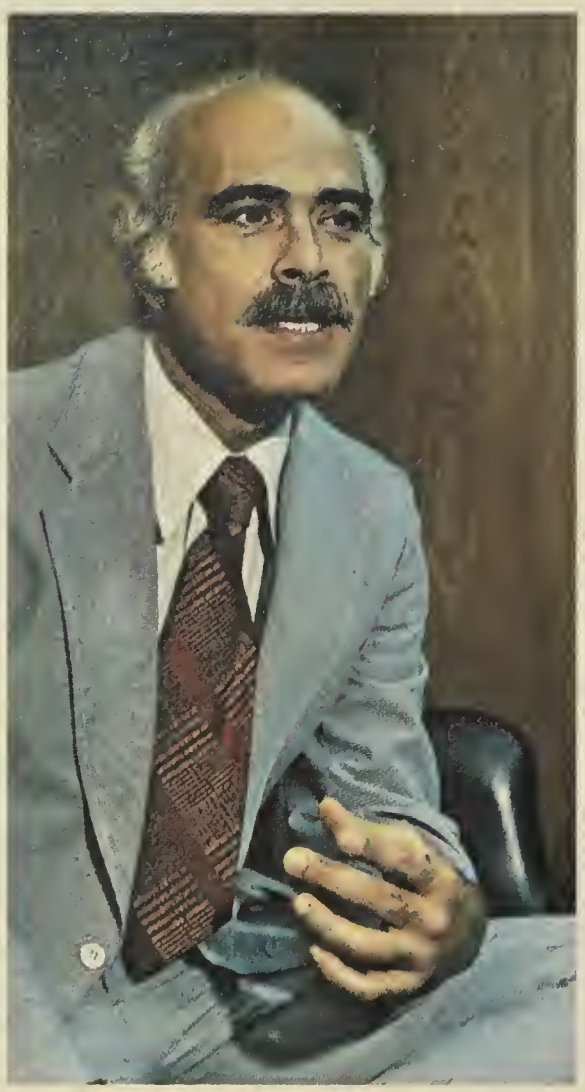

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Output of This System Not Gobbledygook

STORM LAKE, Iowa — While you're gobbling up your holiday meal next weekend, you might think of the Midwest turkey farm here that uses a small system to help make decisions on "when to bring fresh and frozen turkeys to market."

The system is also used for general business applications, according to Steven C. Maxwell, secretary/treasurer for Thompson Industries.

The company is an integrated turkey firm whose divisions encompass egg production, hatching, commercial turkey production and feed mills.

"Accurate records on the organization's various divisions are a necessity," Maxwell said. The firm's volumes — 3.5 million eggs hatched, two million turkeys raised and 60 million pounds of turkey processed — preclude "use of anything but computers to give management timely information on the business."

The system keeps track of frozen turkey inventories and shipments by customer or type of product, production data, feed inventory, accounts receivable and payable, general ledger transactions, payroll, egg sales and commitments.

"When available on a timely basis, this type of information gives us a competitive edge over others in our industry because of the daily fluctuation of turkey market and commodity prices. It enables us to factor costs and other production data into management decisions," Maxwell said.

The DP operations, which expanded overall data entry and program processing with the $170,000 system, consists of a Honeywell Model 62/40 with 72K bytes of main memory, an additional 23M bytes of disk memory and a 400 line/min printer. Three communications lines interconnect major turkey processing sites here and at Ellsworth, Iowa.

"With flock mortality running anywhere from 5% to 10%, margins low and the turkey market volatile, we've got to think and operate much smarter than the competition," Maxwell said.

"Naturally, Thanksgiving and Christmas are the peak periods for a turkey processor, but we're finding that consumer tastes and packer innovations are giving us year-round markets and products for turkey meat.

"Beef and pork producers are beginning to see our tasty and nutritious substitutes such as turkey ham, hotdogs, jerky and even turkey loaf compete with their traditionally high-fat, high-cholesterol offerings."

A typical turkey flock of up to 10,000 hens and toms will be hatched on the same day and grow to maturity together. From the time a flock is placed as day-old chicks in the brooder house until it is processed, each flock generates a data file which tracks the 16- to 22-week economic and natural history of the birds.

During the life of the flock, mortality counts are taken every two weeks; feed consumption with as many as 20 ingredients per feed mix is recorded; medication, fuel, labor and other overhead factors are assigned and tallied against the flock.

When birds are marketed, the weight and sale price is compared with these cost factors to determine profit or loss on each flock and feed conversion per hen and tom.

"The system then compares market results with data generated by other flocks according to season, whether the turkeys were raised inside or out, sex and mortality causes to provide an accurate profile of success factors," Maxwell said. "When added to the weekly data runs, this type of information gives us one of the most extensive and sophisticated flock-reporting systems in the country; it certainly gives us a distinct advantage over our competition."

At Thompson Industries, the manager responsible for the information gathers the data and inputs it directly into the system.

"Market acceptance of new turkey meat products and internal growth projections to meet demand, as well as volatile pricing, requires accurate cost controls before bringing these birds to market," Maxwell noted. "Most important, management can now react in a timely fashion to affect the result rather than in response to the result.

"Each improvement, now that we have the basic capabilities, will give us better information on our turkey inventories, whether they are inventories reflected in live birds or processed inventory," Maxwell said.

Future system growth calls for increased communications between the headquarters and farms, processing at profit centers through remote job entry minicomputers linked directly to the host, expanded on-line terminals and more memory.

$1 Million Dispatch System

Taxi Fleet's Mini Helps Speed Vehicles to Passengers

By Esther Surden
Of the CW Staff

OTTAWA — Need a taxi? Hate to wait? Computers are taking over at the Blue Line Taxi Service here to help speed vehicles to waiting passengers and passengers to their destinations.

Designed and installed by Digital Methods Ltd., the $1 million dispatch system uses minicomputers from Data General (DG) Canada Ltd. and terminals from Moscan International in New York, according to Wayne M. French, general manager.

"We've been working on the idea for four years," French noted.

System Selects Taxi

When a prospective passenger telephones the taxi company, a call taker types the name and location into a CRT located in the central office. The computer selects a taxi and matches it up with the call.

The taxi gets a reading on a small CRT and the driver can reply to the message if necessary.

"He has 10 seconds to take the call," French said. If the call is not taken, that cab goes to the back of the line it that area and is not called again until his cab comes up to the top of the queue.

"We have the city divided into 23 areas," French explained, "so the cabs can book into whatever area they happen to be in; they do all this booking in from their in-car terminal."

Each terminal has separate identification. When the identification number is punched in, the computer knows which car is calling and books the car into that area.

Blue Line has computerized 100 of its 500 taxis so far and is pleased with the results of the program. The system has been installed since June.

About "95% of the 300,000 population is repeat business," according to Donald Montgomery, the company's owner and

(Continued on Page 22)

Modcomp Turnkeys Designed for Commercial DP

LEXINGTON, Mass. — Two turnkey small business systems designed for commercial DP applications have been announced by Modcomp Business Systems.

Based on the Modcomp II 16-bit minicomputer from its parent company, Modular Computer Systems, Inc., Modcomp Business Systems' turnkeys perform applications such as sales order entry, general ledger, accounts receivable and payable, inventory and payroll, according to a spokesman.

A basic Model 204 includes 64K of user-available core, two CRTs, a 10M-byte disk and a. 165 char./sec printer. It can be expanded to four terminals and is field-upgradable to the larger Model 232, the spokesman indicated.

The Model 232 has 128K bytes of core, five CRTs, two 24.6M-byte moving-head disks, a 600 line/min printer and an operator console. It can be expanded to 32 or more terminals, Modcomp said.

The business systems operate under Modcomp's MAX III operating system with commercial extensions, the DBMS 200 data base management system and teleprocessing monitor software.

Modcomp Model 232

The larger 232 uses the Modcomp 1900 series communications subsystem with an asynchronous communications multiplexer that can support up to four multiplexers. Each of the four multiplexers can support 16 communications channels, the firm said.

With the systems, Modcomp Business Systems announced a software package called Industry Management System (IMS) 201 for handling management system applications for industrial distributors.

The package, which can be used on both the 204 and 232, handles sales order entry, customer billing, inventory management, accounts receivable, sales analysis, sales commission calculations and purchase order control.

A detailed audit trail is maintained by the system to provide accounting continuity, the firm said.

The basic Model 204 costs $54,600; the Model 232 costs $96,050. The IMS 201 software costs $9,000.

Modcomp Business Systems is at 21 Worthen Road, Lexington, Mass. 02173.

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First User of Syfa Linking Remote Depot, Central Site

MANCHESTER, England — The first user of the Computer Automation, Inc. Syfa system is connecting a remote depot with a central site for on-line applications.

Wright & Green, a grocery distribution and retail organization, will use the distributed system to provide its branches with on-line sales, inventory and financial controls operations.

The firm selected the system on the basis of cost, response time and the need to service all its distribution points, according to a spokesman.

The firm also wanted a system that could be upgraded easily, he added.

Prior to installation of the Syfa, the firm used a batch processing system connected on-line to a computer service bureau. The smaller supply depot was not receiving the same quality of service as the larger depot.

The Wright & Green Syfa system includes a CPU with a 64K memory, two 80M-byte disk drives, eight Syfa information station terminals, two high-speed line printers and one character printer. The remote depot uses two of the information stations and the character printer to access the central system's services.

The system cost is about $135,000, the spokesman said.

The processor and remote terminals are linked by 4,800 bit/sec telephone lines via modem/multiplexers. So far, on-line applications include invoicing, sales ledger processing and general warehousing packing lists.

The system will ultimately handle five broad functions — sales order processing, financial accounting, stock accounting, management accounting and retail operation, according to the spokesman.

In sales processing, Wright & Green anticipates the distributed system will significantly cut the cost of listing and processing daily and weekly order lists, changes and availability of grocery items, he said.

Several accounting operations will be augmented by a set of programs, including sales and purchase ledgers, cost/profit ledgers for management and bank reconciliation for each operating center.

Grocery stocks will be produced as a daily list, which include price changes and profit margins, plus turnover rate of stocks — a vital statistic for food distributors, he noted.

Budgets are automatically prepared for each center hased on sales and gross profits. Periodic checks will also be made to show actuals against budget and percentages of variances, the spokesman stated.

The system will also produce weekly statistical summaries of the electronic cash registers which the Wright & Green group uses in its retail operations, he indicated.

Wright & Green expect to have the total system functional by the end of the year, the spokesman concluded.

Militarized Mini From Norden Features PDP-11 Compatibility

NORWALK, Conn. — The PDP-11/34M from the Norden Division of United Technologies Corp. is a militarized digital minicomputer compatible with the Digital Equipment Corp. PDP-11, according to the vendor.

The ruggedized mini features an extended instruction set with more than 400 instructions, the ability to perform single- and double-operand instructions, a memory expandable to 128K words, 900 nsec cycle time in core, byte parity, memory management, hardware multiply and divide and a floating-point option, the vendor said.

It can operate in environments of -65°F to 185°F and in altitudes of up to 85,000 feet, Norden said.

In addition, the unit can withstand vibration, shock and humidity; it meets the requirements of the MIL-E-5400, 16400 and 4158 specifications, the firm added.

A basic one-half chassis PDP-11/34M costs $15,200 to $20,200 depending on configuration; the full-chassis system costs $18,500 to $24,700.

A system with 32K of memory and a communications interface ranges in price from $28,000 to $37,500, Norden said from Helen St., Norwalk, Conn. 06856.

Taxi Fleet's System Sends Cabs to Riders

(Continued from Page 21)

president. "We have to keep those customers happy — and the only way of doing that is to have a cab available when it is needed. The computer system will improve our ability to fill that need."

With traditional voice dispatch systems, there are many instances in which "we send cars out for fares that aren't there. Some people may not know the correct name of the street or fail to give an apartment number."

The system checks out the street and the call taker is prompted to get the apartment number before giving the order to the computer, he said.

"As for customer convenience, cutting out radio conversation between driver and dispatcher gives a quieter, more pleasant ride. Elimination of the noise is easier on drivers, too; they don't tire as easily — and the result is more money in their pockets," Montgomery said.

DG hardware was chosen for the central system after a recommendation from the firm's software vendor, French added. It was a "toss-up" between DG and Digital Equipment Corp. CPUs and DG was selected "because of cost to a point and because it was a better computer for what we wanted," he said.

A voice link backup is maintained with the cabs if the system goes down and the company needs to revert to its old way of doing business, he noted.

Recently an incident that required backup happened, he continued. The firm wanted to show its system at the Taxicab International Show in Boston and needed to take some of its original equipment to the show because the backup equipment was not ready in time from DG.

"In the process of bringing the equipment back and forth, some of it got damaged and one of the customs people dropped one of the replacement units that were coming into New York," French recalled.

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DSC Enhances, Cuts Price of Galaxy/5

WALKERSVILLE, Md. — Digital Systems Corp. (DSC) has reduced prices and enhanced the Galaxy/5 distributed processing computer.

The Model 140 with two CPUs, 128K of memory and two direct memory access channels (DMA) has been reduced from $72,600 to $60,800. The Model 150 with three CPUs, 256K of main memory and three DMAs now costs $120,960 compared with $157,680, DSC said.

The reduction was a result of "normal business review," according to a spokesman.

Three additional devices for the Galaxy/5 system were also announced:

- A 1,300 line/min electrostatic printer costs $6,400.
- A 9-track tape drive with controller, which operates at 1,600 bit/in. and 45 in./sec, costs $9,850.
- A card reader with CPU attachment that can read up to 300 card/min costs $4,300.

Also announced was a directory of system-level software available with the Galaxy/5. It is free of charge, the spokesman noted.

The directory describes the system's operating system, assembler, linkage editor and disk sort as well as various data management techniques available. These include sequential data management, index data management, printer management, an access method for local printers and printer spool files.

DSC is here in Walkersville, Md. 21793.

Forte Has 8-Word PDP-8/A Link

NATICK, Mass. — Forte Technology, Inc. has an 8-word plug-in interface for the Digital Equipment Corp. PDP-8/A system.

The Forte 8W interface allows direct input from a number of external data sources or peripherals, the firm said. Codes for the group of input words and interrupt/skip/clear functions are jumper-selectable, it noted.

Word Arrangement

The eight words are arranged as two words and two interrupts in each of four input connectors.

The 8W can also be used with the standard DEC instruction set to interface a Forte 400 high-speed tape reader to the PDP-8/A. The 150 char./sec reader uses one of the four input connectors, allowing the remaining three to be used for other inputs, the company added.

The interface costs $495; the interface and tape reader cost $1,195, Forte said from 15 Strathmore Road, Natick, Mass. 01760.

DEC-Based CPU Offered for OEMs

HARTFORD, Wis. — General Robotics Corp. (GRC) has an OEM CPU based on the Digital Equipment Corp. LSI-11 micro.

The GRC11/03 includes both an LSI-11 double-sized backplane and a PDP-11 Unibus adapter port; it can be used as a direct replacement for any LSI-11, PDP-11/03 or PDP-11/04 mini, the firm said.

The standard GRC11/03 includes an extended instruction set, floating-point arithmetic, 20K words of random-access memory, extended memory addressing to 512K words, a serial I/O module with switch-selectable data rates, a Unibus peripheral port and eight additional dual-height module slots.

The CPU costs $4,995 in OEM quantities. GRC is at 57 N. Main St., Hartford, Wis. 53027.

biggest competitor.

Golf Course Owner Aces Time Problem With Small System

TOKYO — Japanese leisure activities firm Kokudo Keikaku Co., Ltd. has scored the financial equivalent of a hole in one.

With the aid of a small business system, the company has cut to eight seconds the amount of time required to process each customer's tab at its golf course at Hakone-Kurakake. Previously it was 60 seconds, according to the user.

Kokudo Keikaku has more than 100 subsidiaries and affiliates. Its operations include 27 golf courses, 36 hotels and such facilities as skiing grounds, skating rinks and swimming pools.

It launched the first stage of a companywide revamping of its complicated front-office operations by purchasing a desk-top computer, the Datapoint 2200 system marketed internationally by TRW Datacom International.

Variety of Transactions

The front office of the Japanese firm's golf links processes a variety of financial transactions involving customers — classification of chits according to customer, billing checks, posting of payments and the keeping of daily and monthly accounts. Payments for caddies and dialy accounts are processed after the close of business.

This daily routine has been increasing with the rise in interest in sports, and DP has become a problem for such courses.

Kokudo Keikaku installed the system in January in what was reportedly a first step toward wider computerization of its varied operations.

Terminal In Gift Shop

Clerks at a course's restaurant, gift shop, refreshment stand and locker room (for caddie payments) operate terminals linked to the front-office computer in an on-line, real-time mode.

The system has simplified front-office jobs and data is gathered more quickly, improving efficiency and reducing manpower needs from four to two clerks, the firm said. Also, customer service has been improved by reducing the waiting time and crowds during checkout periods, according to the user.

Plans are under way for a second installation at the Hakone-Kurakake facility to handle sales records on an item-by-item basis and process statistical information for management reports. The firm is also considering introducing similar systems at its other facilities.

The system at Kokudo Keikaku consists of the Datapoint 2200, diskette storage, a serial printer and several TRW 4103 keypads.

CI Notes

Harris Planning to Buy SDS

NASHUA, N.H. — Harris Corp. and Sanders Associates, Inc. have reached a preliminary agreement for the sale to Harris of Sanders' Data Systems (SDS) Division for about $17 million in cash and the assumption of certain liabilities, the firms announced.

Harris plans to operate SDS as part of its Data Communications Division and to retain current management.

Harris President Richard B. Tullis said the line of Sanders terminals will complement Harris' position in the remote batch communications segment of the distributed DP market. The firm plans to increase production of the 8170 and 8180 terminals, he added.

Since plans call for the acquisition of SDS at a price below book value, Harris expects to operate SDS profitably from the outset, he said.

The pretax loss to Sanders is estimated at about $19 million, according to Sanders President Harold Pope. However, earnings from its Federal Systems Division will substantially reduce the reported loss for this fiscal year, and future tax benefits are expected to fully offset the loss, he said.

The proposed agreement does not involve Sanders Military Systems Division, which also makes CRTs, or Sanders' antitrust litigation against, IBM a Sanders spokesman said.

Adds Asks Court to Halt Sale of Milgo Stock to Racal

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (Adds) has obtained a federal court order temporarily restraining Milgo Electronics Corp. from selling stock to Racal Electronics Ltd. [CW, Dec. 13].

The order bars Milgo from selling 321,000 shares of common stock to the British firm.

Adds had previously made two offers to acquire control of Milgo in an exchange of stock, but Milgo management opposed the plans [CW, Nov.22].

CA Wins Distributed Net Award

IRVINE, Calif. — Computer Automation, Inc. (CA) has received an order for its Syfa systems from Fireman's Fund Insurance Companies (FFIC), a unit of American Express Co.

If fully implemented, the order to meet requirements for a nationwide DP network will include 50 Syfa systems and result in revenues in excess of $5 million.

Three Firms Win Contracts

GSA Opens Federal Teleprocessing Arena

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Three companies have recently garnered approval from the General Services Administration (GSA) to market their teleprocessing wares to federal agencies here.

Computer Network Corp., First Data Corp. and United Computing Systems, Inc. are the first of many companies to be included in the GSA's Teleprocessing Services Program (TSP), a program valued at $50 million to $80 million.

Under TSP, agencies can acquire interactive, remote batch and "full" (including interactive and remote batch) services from commercial vendors, according to Dr. Michael Muntner, assistant commissioner of assistance for agency planning and policy in the GSA.

Effective since last August, TSP at once fills the void created by the expiration of the GSA contract with Computer Science Corp. (CSC) and its Infonet on June 30 and satisfies an increased emphasis within the Federal government on DP services provided by the private sector, according to an industry consultant.

To a company, the firms holding a place on the TSP contract schedule believe the marketplace, dominated for four years by the GSA contract with CSC's Infonet, will open up.

"Being a prequalified, prenegotiated vendor to the federal agencies is the biggest advantage TSP provides," according to Jim Burley, vice-president of marketing for First Data. "We're in the club now."

Infonet had "a virtual monopoly" in offering teleprocessing services to the government, he added.

Principle Advantage of TSP

Paul Michael, federal marketing manager for United Computing Systems, stated the principle advantage of TSP this way: Because the program will become mandatory for federal agencies in search of teleprocessing services from the commercial marketplace once enough companies are on the contract schedule, "if you're not on the program, you're virtually out of consideration."

The exact number of companies needed to make the program mandatory for the agencies remains in doubt, Muntner said. The GSA wants to be sure the companies on the schedule are collectively capable of covering the Federal government's teleprocessing needs before it requires the agencies to select services from them.

"We'll make the program mandatory along the lines of the Schlitz commercial — 'When it's right, you'll know it,' " he said. Muntner suggested "right" might mean "a couple of dozen companies" placed on the schedule over the next two months.

Even after TSP becomes mandatory, the program will remain open-ended in that it will continue to award contracts to deserving firms, he added.

Temporary Regulations

Not all teleprocessing services fall under TSP, according to the program's temporary regulations.

Services not included are local batch processing or facilities management offerings.

In addition, TSP does not govern a teleprocessing system dedicated to an agency's particular application or arrangements in which the Federal government owns the equipment at any time or reimburses the vendor 100% for the equipment under a cost-type arrangement.

The TSP regulations explained agencies have two methods for acquiring commercial teleprocessing services. Agencies can place orders for interactive, remote batch or full services from those firms approved by the GSA and on the schedule.

They can also open their jobs up for full competition in the broader marketplace when they believe lower costs are available

(Continued on Page 29)

International Trade Confronts Hostile Environment: Anderson

DAYTON, Ohio — Despite its vital contribution to the domestic economy, international trade today faces an increasingly hostile environment, according to William S. Anderson.

Anderson, chairman of NCR Corp., which generates half its business overseas, pointed out exports now account for over 10% of all goods and services produced in the U.S., double the percentage of just a few years ago.

Export-related jobs now total more than eight million, he added.

Despite the obvious importance of international trade, the problems currently faced by companies doing business overseas have received little attention, Anderson said.

Foremost among those problems is inflation which more than any other factor "is responsible for the sluggishness of the world economic recovery," he said, while also citing rising raw-material costs, the trend away from a global economy concept, increasing nationalism and shortsighted government policies.

Tax Reform Act

Although international trade helped cushion the recent recession and can be a significant factor in leading the current economic recovery, the Tax Reform Act of 1976 lessens the incentives of U.S. business to engage in overseas operations, Anderson said.

As an example, he cited the reduction of tax benefits available to domestic international sales corporations (Disc) which were created to put U.S. exporters on a par with many European exporters.

The new tax law also increases taxes on dividends carned in less developed countries and eliminates most tax incentives formerly available to Americans working abroad, he noted.

And the Tax Reform Act failed to take steps that would help the domestic economy, Anderson asserted.

"It passed by the opportunity to encourage job-creating capital investments, even though we desperately need such investments if the U.S. is to retain its economic leadership," he said.

Because of the lack of incentives to make such investments, productivity in the U.S. has increased only 15% in the last 10 years, he said, compared with gains of 65% in West Germany and 130% in Japan.

Equally important, the percentage of the Gross National Product going to research and development in the U.S. is almost 25% below its peak level of 1964. This means the U.S. is in danger of losing its technological leadership, he said.

An initial step business can take in overcoming current problems in international trade is to sell its benefits more effec-

(Continued on Page 28)

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Adapso Wants Public to Have Chance in EFT Race

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — Agencies of the Federal government should be prevented from entering into three elements of electronic funds transfer (EFT) — entry, delivery or processing — until the private sector has an opportunity to foster such systems in a competitive environment with minimal government intervention or regulation, according to the Association of Data Processing Service Organizations (Adapso).

"We have no objection to the use of computer equipment by federal instrumentalities such as in the case of the Federal Reserve System," William W. Fletcher, chairman of Adapso's EFT Systems Committee, testified before the National Commission on EFT here recently.

"Where computer equipment is used by the Federal Reserve to increase efficiency in its clearing, distribution and settlement functions, the regional interconnection of automated clearinghouses would not appear to be an improper use of computers.

"They are merely a function electronically which had previously been handled by other business machines," Fletcher said.

Adapso would, however, "strongly object to an attempted utilization of such an interconnected network for the entry, delivery or processing functions anticipated within the [EFT] systems," according to Fletcher.

"The incremental use of such equipment in servicing point-of-sale terminals or in performing DP service functions — such as are normally provided by a host computer and its software programs — would create unnecessary barriers to the entry of members of the data service industry into the marketplace," he said.

In this connection, he said, Adapso would view the use of automated clearinghouses in processing data from private corporations for preauthorized payments to be a processing step more appropriately reserved for the private sector.

Addressing the question of privacy and security, Fletcher said he has no doubt "proper security and privacy controls can and will be developed by the private sector in establishing such networks" and he cannot "see the need for a federal agency to intervene in establishing such communications network for a presumed 'public need.' "

In fact, he said, in his opinion greater security is likely to arise if competing companies are permitted to innovate security devices within their private communications networks.

Several competing communications networks or switches, each with its own security system, would offer the public more protection than one national system with a uniform algorithmic key or encryptographic coding, he said.

"The federal role should be confined to regulating and controlling a network communications system and then only if the private sector fails to develop those systems which satisfy the public need," he contended.

In his testimony, Fletcher also said Adapso has long supported a "maximum separation doctrine," preventing the improper spillover of power from one market to another.

Fletcher cited both computer service companies and federal agencies who possess both "delivery system" and "processing system" capabilities.

They should be required to use separate corporate names, separate marketing or executive personnel and separate facilities and should be restrained from intermarket transactions (such as tie-in sales) to the extent required to permit "fair competition."

Recycling Effort Aids Tape Manufacturing

Special to Computerworld

SUNNYVALE, Calif. — Emission control is not limited to ears nor is recycling limited to cans, paper and bottles.

Information Terminals Corp. (ITC) has installed a "one-of-a-kind" $100,000 recycling system to recover the exotic and highly volatile solvents used in the manufacture of magnetic tape, according to a spokesman.

As a result, ITC has also reduced the plant's emissions to less than those given off daily by the plant's employees' cars in their daily commute to work, he said.

The solvent recovery system gives ITC a production cost advantage in the industry since its ability to recycle expensive solvents will save a great deal of money that, in other operations, goes out the exhaust fans, he noted.

ITC's solvent recovery system works very much like a charcoal filter does on a cigarette, according to the spokesman.

During the magnetic coating process, the solvent evaporates as the coating is applied to a polyester substrate. The magnetic coating is what does the recording. The warm air containing the solvent is then drawn off through activated charcoal traps in large tanks outside the building, he explained.

As a result of this solvent recovery process, ITC could continue in operation for as long as a year without having to buy new solvent. This is an important hedge against the possibility of another unexpected petrochemical shortage, he added.

The solvent recovery system was constructed by Vic Manufacturing Co. under the guidance and according to the design of Jerry Newton, ITC's vice-president of media development, and Frank Fitz, media manager.

Researchers Want Data On Joint Ventures

GAINESVILLE, Fla. — A team studying domestic joint ventures in the computer industry is seeking information in return for a copy of the completed study.

University of Florida professors Sanford Berg and Philip Friedman are conducting the study as part of a larger research project sponsored by the National Science Foundation.

The purpose of the study is to determine criteria by which joint ventures in the computer industry may be evaluated in terms of their effect on competition efficiency, new entry and innovation.

The study seeks information not only on joint ventures, but also on the extent to which various factors such as patents, financial constraints and rapid market penetration influence decisions to participate in a joint venture.

For further information, contact Berg or Friedman, Department of Economics, University of Florida, Gainesville, Fla. 32611.

Systems for all reasons

***Computerworld* presents a special report on *Dedicated Systems - Turnkey and otherwise* in the January 31st issue.**

The cost of raw computer power has plummeted so far in the last 20 years, that it has now become economical to devote entire computer systems (large and small) to the performance of single tasks. These special purpose computer systems fall into two general categories, dedicated systems and turnkey systems. They'll both be covered in our January 31st Special Report.

Edited by Esther Surden, the report will include stories on computer systems that: scan hearts, direct traffic lights in Rome, switch telephone lines for Californians, make investment projections for investors in the futures market, manage energy use, work in libraries, make maps, test students at Brigham Young University, and more.

This special report will cover the hardware and software used in these systems, with tutorials on turnkey and commentary on the problems of system integration, which should be of special interest to large scale users. If you'd like to learn more about the innovative tasks computers perform these days, be sure you read *Computerworld's* special report in the January 31st issue. And if you're in the business of designing, developing or marketing special purpose computer systems, make sure you reserve ad space in this *Computerworld* special report. Ad closing date is January 14. See your *Computerworld* salesman for complete details, or call Judy Milford at (617) 965-5800.

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Here's why Digital's PDP-11/70 is the fastest selling supermini in the world.

In the short time that the PDP-11/70 has been offered, Digital has shipped over 1,000 of them. Customer applications include everything from laboratory research and education to extensive communications and commercial transaction processing.

What makes the 11/70 so popular? There are almost as many reasons as there are users. In conversations with a wide range of customers, four major reasons are repeated time and again: throughput, reliability, software and Digital itself.

"We went to PDP-11s initially because no other systems offered the price/performance. User response was so enthusiastic that we added more terminals and expanded to the 11/70. Our users love it. Reliability has been exceptional."... D.H. Casagranda, Manager, Corporate Systems, ATCO Industries, Ltd.

The 11/70 is a very powerful computer, designed throughout to handle more data far faster than machines costing 5 times as much. It's supported by an outstanding selection of software. And since it's made by Digital, you can expect the highest quality, reliability and support services.

"We have a highly challenging mix of computing requirements. The 11/70 has come through with flying colors."... Loren Gilmore, Corporate Manager of Engineering and Process Control Systems, International Harvester Company.

If you're wrestling with a mixed bag of computer needs, the PDP-11/70's your machine. It has an impressive variety of operating systems, languages, data management facilities and applications packages. It can handle real-time, timesharing and batch in any combination at the same time.

"We chose the 11/70 because it had all the tools we needed for a heavy transaction processing workload. And it's lived up to all our expectations."... R.E. Umbach, Manager, Intercom Systems, Walgreens.

More and more organizations need a system that provides fast turnaround of up-to-the-second information to dozens of users simultaneously. The 11/70 gives it to them: the operating systems, the database tools, the communications and the raw operating speeds themselves.

"The 11/70's power was impressive, but it was primarily the software that sold us."... Mel Culp, Systems Services Manager, Allis Chalmers Power Systems, Incorporated.

The PDP-11/70 comes with a choice of three major operating systems—IAS, RSTS/E and RSX-11—that fit just about any operating requirements. Several languages, like COBOL, FORTRAN, BASIC, APL, DIBOL and RPG-II. And various data management systems, including multi-key ISAM and the only CODASYL-compatible Data Base Management System available in its class.

"There were only two companies that had the communications capabilities we wanted. On all counts the 11/70 was superior."... Royle Vagle, Director of Data Processing, Cooperating School Districts of the St. Louis Suburban Area, Inc.

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IBM Lost 'Total Control' Over User Community: Biddle

ARLINGTON, Va. — "For the first time in our industry's history, IBM has lost its total control over the user community — it is the user that is now constraining IBM's moves, not IBM itself," Jack Biddle recently told the Computer Dealers Association.

Analyzing the shift that has taken place in the computer industry in the past several years, Biddle, president of the Computer and Communications Industry Association (CCIA), noted the rapidly increasing sophistication of key decision makers in the DP user community.

He also pointed out that procurement decisions are now made only after lengthy cost analyses — no longer are procurement dollars committed on the golf course.

"More and more users are becoming multivendor shops and liking the improved performance and vendor responsiveness they have gained," he said, adding many users had greatly increased their technological understanding of both hardware and software in order to take advantage of the benefits offered by the minis and micros.

"The user realizes he cannot tolerate another revolution like the 360, but must instead protect his massive investment in system familiarity and in software through a careful evolution," Biddle continued.

He further said users are now insisting that any new computer product handle existing software, peripheral equipment and procedures with the barest minimum of disruption — a trend which has lessened the fear of obsolescence considerably, consequently firming up prices in the used computer equipment market.

One of the greatest changes among users, according to Biddle, is that "they no longer need to be at 'the leading edge' among their peers."

The sophisticated user is looking over the entire market carefully, he added, and discovering "a lot of suppliers out there with technology equal to or superior to IBM's, with service as dedicated and competent and with a strong desire to provide solutions to user problems that are to the benefit of both the user and themselves."

Interesting Dilemma

"IBM finds itself in an interesting dilemma," Biddle remarked.

Noting its original schedule for the introduction of a new generation — the Future System and its operating System Q — was next year, he said IBM had run into three unforeseen problems.

First, the necessary software proved a larger undertaking than even IBM's resources could handle.

Next, the user didn't allow himself to be shifted to Multiple Virtual Storage and virtual machine-oriented systems or hooked on the idea of large integrated data bases as IBM thought he would.

And lastly, IBM realized the "communications-oriented DP network of the future had to have access to a switched network" with higher capability and at lower cost than those available from Bell.

While these obstacles effectively prevented IBM's introduction of its next generation, Biddle said, "IBM management still had to maintain its 14% per year rate of growth."

IBM accomplished this by shifting lease purchase ratios, he contended. The increased sales additionally provide it with the capital necessary to finance Satellite Business Systems, to expand the General Services Division and to further erode Xerox's control over the copier market — the three ingredients to the real growth that will take place in the 1980s as the transition to the electronic "office of the future" begins, he said.

Speculating on the industry environment in the next few years, Biddle suggested "we will see a continuing kludge of new IBM offerings," each apparently directed toward a relatively narrow segment of the market, but each containing later enhancements "unknown to all but IBM."

He predicted a period of "IBM-inspired uncertainty with the clear IBM message that 'there will be massive change . . . in '79 or '80 or maybe '81 — play it safe — don't stray too far from IBM.' "

Concurrently, IBM will try to change the entire pricing structure of the industry, he added.

Biddle remarked this is "the first real chance that this industry has ever had to become truly healthy and truly competitive. You see, IBM has killed off its competition — but competition thrives."

The dwarfs, Burroughs, NCR, Honeywell, Univac and Control Data Corp. — the traditional mainframers — have learned their lesson, according to Biddle. "They cannot displace an entrenched IBM system any more than IBM can replace theirs," he explained.

So even the "10 percenters have learned you can't divide 30% of the market" between seven competitors and have each come out with the 10% needed to be viable and begin to specialize, he stated.

Dealing With Specialists

IBM has always been able to deal with "specialists" before by aiming "its mighty howitzer" in their direction, Biddle said. But today, he added, "everywhere IBM looks there are little companies . . . offering the user more innovative products and services than IBM."

In order to "deal" with them all, IBM "must offer equal or superior products all across the board at prices that are competitive with some pretty lean and hungry outfits. That has to be an almost insurmountable challenge," he said.

All this indicates the competition will continue to grow stronger, healthier and financially sounder, he noted.

In his concluding remarks, Biddle recalled that "four years ago I compared our industry to a race between Secretariat, seven mules and 70 lame ducks. It wasn't a horse race — it was a parade. Today, I think a different analogy is appropriate.

"Our industry is in a field of clover — Secretariat is still there, a little fatter but munching his share. But today that field of clover is populated by hundreds of quick and agile rabbits — and believe me, a couple of hundred rabbits can eat one hell of a lot of clover."

Hostile Environment Confronted: Anderson

(Continued from Page 24)

tively, Anderson suggested.

He also called for a reduction of trade barriers and urged businessmen to broaden their view of potential markets to include the entire world, not just portions of it.

Despite current problems, there remain great opportunity in international trade, Anderson said. The markets are huge and the U.S. is more competitive today because wages abroad have caught up with and, in some cases, surpassed wage levels here.

In addition, there are encouraging signs of economic recovery in most foreign economies, there is plenty of potential for productivity gains in the U.S. and — despite increasing governmental controls — the U.S. economy still offers greater flexibility than most other economies, he said.

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GSA Services Program Widens Federal Teleprocessing Options

(Continued from Page 24)

or if the schedule contractors can't meet their requirements or conditions.

Agencies will be allowed to "sole-source" an order if only one vendor on the schedule can meet their needs, the regulations stated.

Even while they will have a group of pre-approved vendors from which to select, the agencies will be required by the GSA to evaluate these firms to determine which can deliver the desired service for the least cost over the system's life, the regulations said.

Specifically, at least three technically capable firms must be benchmarked if the system life cost exceeds $500,000 or the annual cost goes over $200,000. If the annual cost exceeds $400,000 or if the system life cost goes beyond $1 million, all technically capable firms on the schedule must be benchmarked, according to the regulations.

'Everybody Wins in TSP'

Muntner emphasized that "everybody wins in TSP" and "there are contracts for every vendor who participates with the GSA in defining the services it offers and how these services are provided.

The GSA does require vendors to offer the Federal government discounts better than their best commercial offerings. In addition, Muntner said the firms must provide volume discounts based on the amount of government business each one does.

Infonet is likely to be offered a contract under TSP, Muntner said. At present, CSC's old contract has been extended through September 1977 with the potential for agencies to extend their use of the network for an additional year.

However, this contract extension applies only to existing agency applications, he said.

Lessons Learned

The GSA's contract with CSC, begun in March 1972, taught the administration many things, Muntner maintained, and these lessons have been incorporated into TSP.

For example, Muntner said the contract with Infonet failed to define what the government meant by "interactive," "remote batch" and "full service."

The result was that if an agency's needs met the full service scope that Infonet provided and if the agency wanted to "go commercial," it had to use CSC's service even if some other approach was cheaper, he explained.

By the same token, if an agency didn't meet the scope of this full service contract, it couldn't go with Infonet, Muntner said.

Time Savings

In addition to learning to allow for those agencies who want only interactive or remote batch services, the GSA discovered the time saved by the agencies working through a contractual vehicle like the Infonet contract and TSP was important. Muntner said the GSA also learned the valuc of discounts for the government from vendors.

The industry generally appears to be in favor of TSP, Muntner commented, adding another franchise to provide teleprocessing services, whether to CSC or to some other vendor, would have received a violent and negative reaction.

Muntner said the agencies might not find it as easy to get service from the TSP contractors because of the least-cost evaluations required by the GSA.

Agencies' Position

Michael of United Computing also feels the agencies don't think TSP will make it easier for them to acquire teleprocessing services, even though that is the GSA's goal.

Even under the scheduled portion of the TSP, the agencies will continue to write requests for proposals whose specifications may lock out 80% of the vendors capable of meeting the majority of their needs,

"The agencies don't really save anything," he continued. "It often costs a fortune to write such specifications." The costs will generally be much less for the agency that buys from a firm listed on the TSP schedule, he maintained.

In addition, an agency can select a number of vendors from the schedule, each of whom can perform one part of its job.

By taking what's best from each vendor, the agency can split the contract up in order to end up with the most cost-effective system, Michael said.

TSP makes agency procurement for teleprocessing services from the commercial market fairer to the industry than it has been in the past, Michael added. "Everyone is under the same rules. No one will get a better deal than someone else," he said.

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Contracts

Digital Resources Corp. has received a $1.7 million contract from the People's Republic of China for two Prospector seismic processing computer systems and associated Respond on-line interactive seismic software.

Ontel Corp. has received an OEM contract valued at over $10 million from AEG-Telefunken. The contract calls for a four-year shipment of Ontel's OP-1 intelligent terminals.

Computer Sciences Corp. has received a $4 million contract for computer facilities management from Mason-McDuffie Co. of Berkeley, Calif., a mortgage banking firm.

Florida Software Services has been awarded DP service contracts from the DeLand State Bank and the Coronado Beach Bank.

Nippon Electric Company Ltd. has received a contract from the International Telecommunications Satellite Organization for a 14 gHz mixer/intermediate frequency amplifier.

Pepperdine University has signed a contract agreement with Systems and Computer Technology Corp. to improve computer services for the university.

Dataproducts Corp. has signed a $3 million printer contract with Data Card Corp.

Boeing Computer Services, Inc. has been awarded a five-year contract by the Air Force Computer Acquisition Office to provide the Tactical Air Command with software support services for the E-3A airborne warning and control system.

Executive Corner

■ Theodore E. Wentz has been appointed vice-president of finance and treasurer of Viking Industries, Inc.

■ Kenneth Moyle has been appointed vice-president of wafer manufacturing and process technology for Electronic Arrays, Inc.

■ Lawrence D. Sault has been named vice-president of industry operations for the Commercial Division of Computer Sciences Corp.

■ Fairchild Camera and Instrument Corp. has promoted six of its executives to division vice-presidents. They are John F. Ordway, national sales manager, Semiconductor Components Division; William J. O'Meara, strategic marketing unit manager, Large Scale Integration Group; William L. Kirkham, general manager, Diode Division; Edward R. Browder, general manager, Digital Products Division; Manuel A. Fernandez, general manager, Transistor Division; and Brian E. Sear, general manager, Systems Technology Division.

■ Microdata Corp. has appointed Lou Hribar vice-president of marketing, Ron Murray vice-president of sales and Don Pagan vice-president of service.

■ Michael Smith has been named manager of planning services for the Petroleum Systems Division of Scientific Software Corp.

■ J. Patrick Carey has been named director of marketing for Escom, Inc.

■ Norman D. Heller has been named director of systems development in the marketing department of Microdata Corp.

■ C.L. McCarty has been appointed director of marketing for the Data Products Division of Lockheed Electronics Co., Inc.

■ Richard C. Cowden was named director of general engineering, George H. Whittaker was named director of peripheral development and Leon Wun was named director of systems development at Mohawk Data Sciences Corp.

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This position offers an attractive starting salary and an outstanding fringe benefit program. Send resume and salary requirements to:

CW Box 4860
797 Washington St.
Newton, Mass. 02160
An equal opportunity employer M/F

SENIOR SYSTEMS PROGRAMMERS

Large western Massachusetts life insurance company with a nationwide TP Network on an Amdahl 470 has two openings in systems programming.

OPERATING SYSTEMS TECHNICIAN

Systems programmer with at least 5 years experience and in-depth knowledge of MVT, OS/VS, and VM. Experience with ASP highly desireable.

TELEPROCESSING TECHNICIAN

Senior level systems programmer with experience in teleprocessing. TCAM knowledge desireable. Our TP Monitor is Intercomm.

Interested candidates are invited to send a confidential resume including salary requirements to:

PAMELA BRODERICK
PERSONNEL DEPARTMENT

Massachusetts Mutual Life Insurance Company
1295 State Street
Springfield, Massachusetts 01111
An Equal Opportunity Employer M/F

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

USE THE ATTACHED ORDER FORM AND THIS ENVELOPE FOR:

- ☐ *a new subscription*
- ☐ *new address*
- ☐ *new title*
- ☐ *new industry*

Order form is attached through binding. Be sure to include current label or label information when making a change.

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BUSINESS REPLY MAIL *no postage stamp necessary if mailed in the United States*

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COMPUTERWORLD

797 Washington Street
Newton MA 02160

CIRCULATION DEPARTMENT

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SENIOR MARKETING OFFICER COMPUTER SERVICES

We Are:

A major New England Bank, an acknowledged leader in custodial services, mutual fund shareholder accounting and corporate services. Our customers include many of the leading Mutual Funds, endowments, corporations and financial institutions. We are completing installation of an extraordinary shareholder stock transfer system which should only enhance our position.

You Are:

A sales professional with extensive background in computers, applications software or service bureau marketing. As Senior Marketing Officer you will call on organizations and stock transfer accounts nationwide. This calling is at a Senior Management level.

You Will:

See the impact of your efforts on the bottom line through this high visibility position. Receive a rewarding salary and officership.

Please send resume and salary history to:

CW Box 4851
797 Washington Street
Newton, Mass. 02160

An Equal Opportunity Employer M/F

EDP

Partial Listing of Positions Available

SYSTEMS

Prog Anal, Cobol	to $18K
Sys Anal, Ins	to $18K
Prog Anal, DBOMP	to $17K
Sys Prog OS/VSI, CICS	to $23K
IMS Specialist	to $20K
Internal Consit. Mfg Financial	to $25K
Prog's, Nationally	to $16K
S/3 Prog Anal, CCP	to $20K

MANAGEMENT

Mgr Data Base, South	to $25K
Oper's Mgr, Mfg	to $28K
Proj Ldr, Ins D.B.	to $23K
Sys Mgr, Mfg, IBM, Mini's	to $24K
Info Sys Mgr, Retail	to $35K
Group Ins Proj Ldr	to $26K
Proj Engr, N/C, T.P.	to $35K
Mgr. S&P, Bnking	to $30K

All Fees Paid by Client Co's
For More Information Contact
STAN DURBAS

ROBERT HALF PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

Product Manager

High Level Languages

Translate this opportunity into growth.

Our dramatic and steady success in the computer field continues to open up exciting new opportunities for top-notch professionals seeking challenge and growth. This outstanding position requires some one with 6 years' experience in COBOL and FORTRAN with technical strength plus sales and/or marketing expertise or heavy user experience; experience in software development would be helpful. Responsibilities will involve interfacing marketing, development and sales activities on major software matters. Beyond an excellent starting salary and full company benefits, we offer unusual solidity and growth potential in a high-level professional environment. Please send resume including salary history in strictest confidence to: Carl Whisner.

INTERDATA®
Subsidiary of PERKIN-ELMER
Oceanport, New Jersey 07757
Equal Opportunity Employer M/F

Computer Performance Evaluation Specialist

Immediate opening for a specialist in CPE. Hardware monitor experience desirable. Current systems: MVS/JES2 on 370-168 and 370-158, MVT/LASP on a 360-91.

Please send resume to Donn Locke, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520.

LOCKHEED

Lockheed-California Company
Burbank, California 91520
An Equal Opportunity Employer M/F

At Robert Half we're as selective in our referrals as you are in your hiring.

After all, both our reputations depend on it.

Because our counselors have accounting, banking and data processing credentials, we're better at evaluating your job requirements as well as a candidate's qualifications.
Results?
You see only the people who are best for you.

RH ROBERT HALF PERSONNEL AGENCIES

World's Largest Finance and EDP Personnel Specialist.

Offices in the United States, Canada and Great Britain.

EDP SYSTEMS AUDIT ANALYST

Our leading healthcare organization currently seeks the talents of a degreed capable professional. The successful applicant should have at least 2 years experience as a Programmer/Analyst in an OS environment. Experience in EDP auditing preferred, though will consider background in accounting.

Responsibilties will include assuring the efficiency and accuracy of EDP systems and operations thru audit analysis and evaluation. Will also be required to insure that EDP applications comply with existing standards and corporate objectives. Salary commensurate with experience and excellent company paid benefits. Qualfied candidates must send detailed resume including salary history and requirements to:

MANAGEMENT RECRUITER

BLUE CROSS/BLUE SHIELD OF NEW JERSEY
33 Washington Street
Newark, N.J. 07102
An Equal Opportunity Employer M/F

ALLEGHENY AIRLINES

AMERICA's 6th LARGETS AIRLINE has immediate openings in our large-scale multiple computer center located in Arlington, Virginia.

Project Leader — Data Base Design and Programming

- Minimum two years IMS/VS or IMS/OS
- Minimum four years COBOL coding and design
- Systems analysis design
- Supervisory experience

PARS Programmer Analysts

- Minimum two years ALC coding under airline control program

Senior Programmer/Technician

- Degree in engineering or physics
- Strong ALC coding experience

We offer challenging career positions with excellent travel privileges, salary, paid health and retirement benefits. Send resume in confidence to Employment Services, Allegheny Airlines, Inc., Wasnington National Airport, Washington, D.C. 20001, Attention H.E. Rouson. Equal Opportunity Employer M/F.

ALLEGHENY

SYSTEMS SOFTWARE

We need Systems Programmer with 2-3 years' experience in ALC and some prior exposure to COBOL and JCL. Telecommunications and systems generation experience an asset. VS experience a must. Coordinate and install in-house time-sharing system.

Excellent salary, benefits and opportunity for continued professional development in this major energy company. Send complete resume to M.B. Shea:

AMERICAN NATURAL SERVICE COMPANY
One Woodward Avenue
Detroit, Michigan 48226

An Equal Opportunity Employer M/F

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DEMAND DEPOSIT ACCOUNTING PROJECT LEADER

Our client, a major Southern California bank, seeks a Project Leader who will lead a group involved in the development of a new DDA System which will be functional through the 1980's. A knowledge of state-of-the-art technology in the development of on-line banking systems is a must. Salary to $25K.

If you are qualified and wish to discuss this opportunity, send resume and salary history in confidence to Randy Hinkley.

professionals for computing

2041 Rosecrans Ave., Suite 363
El Segundo, Calif. 90245
(213) 640-1632
An Equal Opportunity-Employer Retained Agency

DATA PROCESSING AT Amtrak

Amtrak's programs require the development of new systems to support FINANCIAL, OPERATIONAL, ENGINEERING, and RESERVATION functions of a nationwide corporation. We are adding senior and mid-level personnel who qualify for the following:

REAL TIME COMMUNICATIONS PROGRAMMERS

Requires on-line experience for systems development in Assembler language, maintenance, program testing, and the installation of CDC and PDP equipment.

PROGRAMMER & PROGRAMMER/ANALYST

Requires extensive experience in the design and implementation of applications in an IBM OS/MVT or VS environment using MARK IV, COBOL, FORTRAN, TSO, IMS, IBM 3790 programming helpful.

OPERATIONS PRODUCTION TECHNICAL SUPPORT

Requires 1-2 years experience in coding and debugging IBM 360/370 OS JCL, analysis and resolution of production abends, OS utilities, operations documentation review and turnover. Knowledge of MVS, TSO and hands-on computer operations helpful.

SYSTEMS PROGRAMMERS

Requires experience in such areas as: MVS, JES II, TSO/TCAM, VTAM/NCP, VSAM, IMS, and multiple languages, including ALC, COBOL, FORTRAN or MARK IV. Must possess ability to provide fast problem resolution, analyze and interpret performance data, recommend and develop standards.

We offer excellent salaries, benefits, and growth opportunities. Send resume including salary history in strict confidence to:

J.R. Brune, Personnel
AMTRAK
955 L'Enfant Plaza SW
Washington, O.C. 20024
An Equal Opportunity Employer M/F

Vice Pres. - Advanced Systems (D/B)
$40,000 - $50,000+

We have been retained by a major financial institution located in New York City, to recruit an individual who is first and foremost a businessman who can discuss with major corporate users, the systems implications of their business plans to see to it that advanced systems designs support them. He will be responsible for directing a major effort to re-design major systems to accommodate IMS. This candidate must also be a good manager of people, projects and budgets.

Manager - MIS (D/B) Services
$35,000 - $40,000+

Client is a Fortune 200 industrial manufacturing company located suburban to New York City.
Candidate must not only be knowledgeable about IMS, but also alternative D/B systems, knowing the advantages and disadvantages of each, both technologically and costwise. Candidate must be able to determine which applications are and/or not suitable for D/B, who understands the concept of control of information as a corporate asset, and the implications thereof. Candidate must have experience which will enable him/her to interface effectively with non-technical business users throughout the corporation, and be effectual enough to sell advanced concepts without using EDP, D/B jargon to do so. Candidate will supervise a high-powered staff. Accordingly, must be thoroughly knowledgeable and experienced in people/project/budgetary management.

Manager — Application Software Support Services
$40,000 - $50,000

Client is a world famous management consulting firm, seeking a real pro in Application Software Packages, a producer and evaluator.
Candidate will be the national "point of knowledge" for this firm, responsible for providing resources and skills capable of:

- evaluating the application software package potential from a technical (but not a market standpoint) of field efforts not originally intended to generalize a problem.
- to provide resources to develop software when we believe we should make rather than buy
- to provide resources to technically appraise sofwtare when we find opportunities to buy (and to include license).

Candidate should have definite promotional capabilities for partnership.

ALL OUR CHARGES ALWAYS ASSUMED BY CORPORATE CLIENTS

Contact: John D. Simon

halbrecht associates. inc.
201 East 42nd Street
New York, N.Y. 10017

SYSTEMS DEVELOPMENT

OPPORTUNITY for an individual to join a small team of professionals in the systems development section of an MIS facility. The facility currently supports an integrated data base for financial, personnel, billing, inventory, and fleet maintenance serving multiple municipalities; with future development to include law enforcement, fire assistance, and land use planning.
RESPONSIBILITIES will include all communications with user deaprtments necessary for definition, design, and development of real-time and batch applications; recommending improvements in development methodology, assisting in training of junior personnel, and timely completion of all projects.
REQUIREMENTS include degree in computer science, or equivalent experience; commitment to complete CDP requirements; activity in professional associations; ability to facilitate projects with minimal supervision, thorough knowledge of CCP and RPG; and a commitment to providing the best in user services. Experience with S/360/370 DOS/OS/VS a plus. HARDWARE is IBM S/3-15, 128K, 3340, tape and 3270s.
MONTHLY SALARY range $992 to $1263; benefits are excellent. If you are interested in working in a progressive environment, and satisfy all requirements; then provide a resume, samples of written communications, and salary history to: Personnel Officer, City of Naperville, 175 W. Jackson, Naperville, IL 60540.
Equal Opportunity Employer

DATA PROCESSING
ASSOCIATE DIRECTOR
Computer Resources
R.I. Junior College

Assists in the direction of analysis, programming and operations. Responsible for the review and evaluation of computer personnel and for recommendations of hardware and applications. Maintains day-to-day control of data processing activities. Masters degree preferred. Minimum of 8 years data processing experience with a minimum of 2 years in management of medium to large scale computer system using Data Base and Teleprocessing. Salary range starts at $18,101.

Please submit resume with complete history of education and experience no later than December 20 to Advisory Committee, c/o Mr. Paul Bartolomeo, Director of Computer Resource Center-R.I. Junior College, 400 East Avenue-Warwick, Rhode Island 02886.

An equal opportunity employer

IMS SYSTEMS PROGRAMMERS and DATA BASE ANALYSTS

Consider joining our particularly successful firm in our progressive IMS/MVS installation. We have immediate openings with unusually challenging opportunities.
We will consider people who have two or more years of experience in all of the following areas:

IMS and DL/1
Data Base Design
ALC
COBOL

Competitive salaries and excellent benefits. Please send resume and salary requirements to:

Jim Borden
SAFECO INSURANCE COMPANIES
Safeco Plaza
Seattle, WA 98185
an equal opportunity employer

CENTRAL WISCONSIN

Sixth largest Medical Clinic in U.S. has opportunity for a programmer/analyst. Location offers exceptional living environment. Excellent benefits include three weeks vacation. Degree required, Computer Science or Math preferred. Person selected will be a highly productive, team oriented professional with heavy experience in several of the following areas: structured programming, COBOL, on-line systems database, communications, health care applications, Burroughs medium systems. Send resume with salary history to Assistant Director of Employee Services, Marshfield Clinic, 1000 North Oak, Marshfield, WI 54449. An Equal Opportunity Employer.

TERMINAL SYSTEMS DIVISION
Cambridge, Ohio

SR. SOFTWARE ENGINEER

This position involves interpreting systems specifications and developing software communication requirements for future Retail POS Terminal Controllers. In addition, will evaluate retail system software requirements in terms of available TCS and Mini-X software as well as coordinating TCS and Mini-X software developments.
5 years experience with micro/mini-processors and real-time programming. In addition, a BS and MS in computer science, computer engineering, or other applicable areas.

ENGINEERING PROGRAMMER ANALYST

To design and develop C.A.D. programs for use by our Point-of-Sale terminals systems engineering departments in a design automation activity to include simulation, PCB, I.C. layout, and interactive graphics applications. A good background in COBOL and/or FORTRAN and some recent experience wiht CDC Cybernet or G.E. Mark III O.S. are desirable. A degree in engineering/computer science will round out your qualifications.

NCR's Point-of-Sale division in the hills of east central Ohio offers excellent professional work opportunities and we invite your consideration at your earliest convenience.

NCR

Robert W. Donovan
Terminal Systems Division-Cambridge
NCR Corporation
Box 728
Cambridge, Ohio 43725
(614) 439-0398

An Equal Opportunity Employer

To Software Systems Specialists seeking challenge

Are your software systems programming capabilities challenged? We offer 3rd generation hardware and software (IBM) with wide spectrum on-line and batch applications covering both business and scientific information processing and problem solving.

Immediate openings are for experienced software systems programmers with experience in maintaining and enhancing OS/VS, OS/MVT or IMS systems on IBM 370/360 computers. Current operating systems: MVS/JES2 on 370-168 and 370-158, MVT/LASP on a 360-91. TSO, RJE, IMS and interactive graphics are supported. Large networks of a variety of on-line terminals. IBM Mass Storage System and latest model disk drives are installed. Performance measurement background highly desirable. Degree in Computer Science is preferred.

Call Duane Bickel (213) 847-4049. Send your resume to Donn Locke, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520.

LOCKHEED

Lockheed-California Company

Burbank, California 91520

An equal opportunity employer M/F

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New Hampshire Beckons

PRO-GRAMMER ANALYST

The PEERLESS Insurance Company in beautiful Keene, New Hampshire needs PROGRAMER/ANALYSTS with varying degrees of experience START IMMEDIATELY OR BE HOME FOR HOLIDAYS

TWO OR MORE YEARS EXPERIENCE in auto insurence applications BAL is a plus, but we will consider COBOL experienced people to train For BAL on 3rd ganeretion equipment

NO INSURANCE APPLICATION experience required, but 2 to 3 yeers BAL 3rd generetion equipment experience is a must

Many opportunities open

Keene is one of New Hempshire's nicest communities New Hempshire has NO stete sales or income taxes If you want to work and recreete in a rural setting thet's close to metropoliten erees send full resume in complete confidence to

Micheel Cebot
Peerless Insurance Co
62 Meple Avenue
Keene N H 03431
or cell - 1 (800) 258 5303

AN EQUAL OPPORTUNITY EMPLOYER

District Sales Manager

WANGCO is searching for a District Sales Manager. You must have 4 years' current field sales experience with a computer manufacturer preferably cartridge disc drives. Peripheral sub system experience considered a bonus. Electronic engineering degree or equivalent.

Position is in the Southeastern United States. Excellent company benefits.

Send resume, including salary history, in confidence to:

Bob Kroskrity
535 Broadhollow
Melville, N.Y. 11796

An Equal Opportunity Employer

NATIONAL SALES MANAGER

Our client, a National Computer Service firm headquartered in California is seeking a dynamic, results-oriented National Sales Manager to effect a penetration of new markets. In-depth knowledge of telephone company structure to include key decision-making individuals is required. Specific experience necessary to qualify for this position includes:

- A proven track record of successful sales achievement.
- A comprehensive knowledge of data systems software and programming, and
- Experience in, or readiness for, Sales Management.

The qualified candidate must be capable of producing near-term revenues from existing accounts as well as formulating and executing a marketing strategy for future business expansion.

Compensation package is flexible. If modest goals are met, annual income will be in the fifty thousand dollar range, with no upper limit on commissions.

We are consultants to management. For immediate consideration, please send resume and salary history in confidence to CW Box 4847, 797 Washington St., Newton, Mass. 02160.

PROGRAMMER NEEDED

Mini-computer programmer for Hospital and clinic operations needed to write programs for accounting and research procedures. Anticipate using IBM System 32 computer. Some accounting knowledge would be helpful to act as assistant controller. Organization located in southeastern Kentucky, Call personnel Manager for interview, (606) 672-2901.

EDP SYSTEMS SPECIALIST

Salary area $18,000

Do you have good client contact skills?
The challenges of designing new commercial systems and of interfacing heavily with users are both yours in this new position. Work in a project group under the DP Manager in this energy company's expanding EDP department. Two years EDP experience desired.
For further information, please contact Tom Fischer at (713) 658-9898.

ALL FEES ASSUMED BY CLIENT COMPANIES

M. David Lowe
Personnel Services, Inc.
420 Houston Natural Gas Bldg.
Houston, Texas 77002

EDP SYSTEMS ANALYST

We are a growing multi-line insurance company doing business in 11 Northeastern states. We are seeking a "Results Oriented" Systems Analyst with a demonstrated record of performance. The position requires 3-4 years of insurance systems experience with a heavy emphasis on EDP. Candidates should more specifically have a life-data base or general P & C background.
We offer a sound company paid benefit program and salary based on experience and qualifications. Send resume and salary requirements to:

Personnel Director
FARM FAMILY INS. COS.
P.O. Box 656
Albany, N.Y. 12201

An Equal Opportunity Employer.

PROGRAMMING MANAGER

New position in expanding 370/145 shop offers high visibility to strong technician w/proven mgmt ability. Requires min 5 yrs COBOL prog exp, in-depth bkgd. 360/370 DOS or DOS/VS + knwl mfg systems. Knowl BAL, T/P a plus. To $20K. Fee paid. Contact Bill Grady (in confidence)

ROBERT HALF PERSONNEL AGENCIES
140 Federal Street
Boston, Mass. 02110
(617) 423-6440

ASSISTANT DATA PROCESSING MANAGER/ ON-LINE SYSTEM

Class 1 Motor Carrier located in South Bend, Indiana requires a Programmer with thorough RPG 2 experience to supervise its developing on line system. The ideal candidate will have experience working with an existing on line system for another motor carrier. Excellent salary and benefits. Please send resume to Director of Personnel, Room =5, Tucker Freight Lines, Inc. 1415 S. Olive St., South Bend, Indiana 46627.

THE ZIA COMPANY

Los Alamos, New Mexico 87544
Prime Contractor to ERDA

ELECTRICAL ENGINEER POWER PLANT

Position open for person with an engineering degree or equivalent, and experience with hardware and software equipment similar to TRW SCADA system using MODCOMP II Computer and Conventional controls for an electrical generating power plant.
Apply or send resume to:

Personnel Director
THE ZIA COMPANY
Los Alamos, New Mexico 87544
(An equal opportunity employer)

data processing

The Crane and Excavator Division of FMC Corporation, a long-time quality designer and manufacturer of LINK-BELT® cranes and excavators, due to current expansion has immediate openings for experienced individuals in the following fields:

data base administrator

This position requires an individual with extensive IMS-DL/1 experience, proven analytical skills, and experience in data base design for communications-based systems. This ground floor opportunity requires an individual to aid in the planning of our new system and analyze and recommend data based solutions for the system requirements.

Excellent starting salaries are offered to match your experience in all of the above positions, a comprehensive company paid benefit package and a great location for work and family life. Send your resume or a letter with salary history to: Mr. Terry Fouts, Manager or Professional and Technical Employment; FMC; Crane and Excavator Division; 1201 Sixth St., S.W.; Cedar Rapids, Iowa 52406. We are an Equal Opportunity Employer M/F

FMC

PROGRAMMERS/ SYSTEMS ANALYSTS

NCR's CRITERION COMPUTER SYSTEM has created immediate openings at NCR San Diego

- Design and implementation in support of major subsystems of a large, multiprogramming virtual storage operating system.
- Support/enhance compilers, operating systems and peripheral software.
- Design, develop, implement and test COBOL, RPG, and other high-level language integration support applications and test programs.
- Develop special diagnostic test programs for Criterion. Examine hardware logic, write test segments, incorporate debug facilities required by techs and document program use.
- Design and develop virtual machine firmware for a new computer system. Knowledge of operating systems and compilers required. EE or CS Degree plus 5 years' programming experience with at least 2 years' assembly programming.
- Design, program, test and document business applications for support of product development processes.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents.

Please submit resume (which MUST include salary history) to:

PLACEMENT DEPARTMENT

NCR

Data Processing Division
16575 W. Bernardo Drive
San Diego, Calif. 92127

An Equal Opportunity Employer

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DIRECTOR OF DATA PROCESSING

Computers and systems analysis are "second nature" to the candidate we seek to guide data processing development at our new, regional Medical Center. Located in the heart of Maryland's rustic "Eastern Shore", we can offer wholesome, family-centered living; yet, our cultural attractions are "excellent", ranging from a four-year college through unrivaled outdoor attractions.

If you have 5 - 10 years of relevant data processing experience, preferably in a medical setting, and a college degree, we would like to hear from you. Please send your resume, including salary history, to CW Box 4849, 797 Washington St., Newton, Mass. 02160.

AN EQUAL OPPORTUNITY EMPLOYER, M/F

SENIOR PROGRAMMER/ ANALYST

Excellent opportunity with a NYSE manufacturing-distributor subsidiary located in the Midwest. Must be experienced in RPG II with four years experience in accounting, cost and inventory control systems. All replies will be kept confidential.

FRANK SMITH

SAFELITE INDUSTRIES

P.O. Box 1879
Wichita, Ks. 67201 or call 1-800-835-2364

South Florida Programming Opportunities

make milgo your future

Milgo Electronic Corporation, a leading manufacturer of data communication equipment located in South Florida, has an immediate opening for a Systems Specialist. The individual we seek shoud have 2-5 years systems analysis and programming experience with business applications. A knowledge of ANS Cobol in an on-line data base oriented environment required. Experience with Univac 1100 series computers helpful. College degree preferred.

Also, we have additional programming openings in Engineering that require microprocessor and mini-computer experience.

Milgo offers excellent salaries, complete company benefits, liberal relocation allowance and the benefits of South Florida living. To arrange for your personal interview, call Dan Haynes collect at (305) 592-8600 or send your resume in complete confidence.

Milgo Electronic Corporation
8600 N.W. 41st Street Miami, Fla. 33166

Equal Opportunity Employer

GROWTH
GROWTH
GROWTH

YOURS AND OURS — We need ten career-oriented computer systems professionals to staff our expanding consulting offices located in the NE, SE and MW. Positions range from Senior Programmer to Project Manager. We offer:

- Development and Implementation - No Maintenance
- Diversity of Application Areas
- State-of-the-Art and Management Science Technology
- Variety of Large Scale Computer Equipment
- Wide Exposure and Involvement with Users
- High Visibility on small but Highly Professional Project Teams
- Unstructured Creative Atmosphere
- Highly Competitive Salaries and Excellent Fringes
- Exceptional GROWTH Opportunities

Minimum qualifications required are two or more years of demonstrated COBOL programming proficiency, a college degree, and an aggressive willingness to be challenged and GROW.

If you are interested in this unique opportunity to further your career, please send your resume including salary history and a statement of your objectives, in complete confidence to:

CW Box 4852
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer M/F

PROGRAMMER ANALYSTS PROGRAMMERS

Put your skills to work in an atmosphere of true professional excellence — offering high visibility, wide variety of applications and advancement opportunities. Ideal candidates will be experienced (2-5 years) in applications and development programming for the casualty insurance or financial services industry. Software development experience an additional plus. IBM 370-135, 138 DOS-VS shop, using COBOL, BAL, RPG.

Top salaries, benefits, working and living conditions in beautiful lakeside city of 50,000 in Wisconsin, America's Vacationland. Interested? Send letter or resume including salary history and requirements to S.L. Sisson, Personnel Director.

HERITAGE INSURANCE
2300 Kohler Memorial Drive
Sheboygan, Wis. 53081
Equal Opportunity Employer

Programmer/Analyst Property & Casualty Insurance

We are a highly successful, medium sized Insurance Company with an opportunity for individuals with at least two years of Cobol Programming in a property and casualty insurance environment. Excellent benefits and working conditions in an ideal small town atmosphere. Send your resume to M. Savan, Westfield Companies, Westfield Center, Ohio 44251.

SR. PROJECT MANAGER

Do you enjoy dealing with clients on a direct basis? Expanding service bureau has many diverse projects. Exp with IBM, COBOL, PL/1 and some mini exposure. You will be paid for decisions. $30K. fee paid.

ROBERT HALF PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

FACULTY POSITION

Department of
Computational Science
UNIVERSITY OF
SASKATCHEWAN

Applications are invited for a tenurable faculty position at the assistant or associate level, Ph.D. in computer science or closely related field required. Position may be filled on a temporary basis by a person with a M.Sc. in Computer Science. Strong interest in systems analysis, data bases, data processing or information systems is essential. Must have thesis in one of these areas or related practical experience. Department faculty of ten with good publication record, and established undergraduate and M.Sc. programs, salary at appointment within range $16,500-$27,500. Appointment July 1, 1977.

EDP OPPORTUNITIES

AVP Trust Systems-NYC-automate existing system — $40-45M
CORPORATE Planning-NYC-econometrics Mgt Sci-O.R. — $30-40M
AVP Financial systems NYC-Big 8 or CPA. Controllers division — $30-35M
MANAGER P/S NYC 370 OS/VS CICS — $28-32M
SALES NYC-major vendor lge scale or mini exp — To $30M
MANAGER S/P NYC 370 DOS CICS-direct staff of 20 — $25-28M
SYSTEMS Consint-NYC-Fortune co mfg systems. 20% travel — $28-29M
SR. SYSTEMS ANAL-NYC-major client-planning CICS applications — $25M
PROJECT Mgr NYC-auto issue-C.F.O. — $24M
SOFTWARE Support-NYC CICS/VS-Sysgen Mis — $19-23M
PROJECT Leader-NYC-CICS credit applications — $21-23M
SYSTEMS Software-NYC-financial client IMS OS degree — $21-23M
SALES NYC-mini computer-turnkey systems — $18-20+ comm.

Bill Borrelli (212) 349-3610
William Harris Associates
150 Broadway
New York 10038

DATA BASE SUPPORT

Leading Mid-West health insurance company has career opportunities for candidates with Data Base related experience.

Selected candidates will meet challenges in a dynamic large-scale multi IBM system computer center using OS/VS, IMS DB/DC and telecommunications. Available positions:

Data Base Technical Specialist
Data Base Applications Specialist
Data Base Document Specialist

We provide a complete company paid benefit program, relocation and promotional and professional growth opportunities. For immediate consideration, forward detailed resume and salary requirements to Ron Morris, Employment Office:

BLUE CROSS AND BLUE SHIELD OF INDIANA
120 West Market Street
Indianapolis, Indiana 46204

An Equal Opportunity Employer M/F

Programmer

COM SYSTEMS ENGINEER

Openings in Several Northeast Locations

Bell & Howell COM products has immediate requirements for systems engineers to provide technical support to our Computer Output Microfilm marketing effort in the Northeast area.

Experience should include successful systems design, commercial application programming, oral and written communications and direct customer interface. COM and minicomputer software experience is preferred. Responsibilities will include presales marketing support, customer training, software installation, and application analysis. Some travel required.

For immediate consideration, please send your resume including salary history (resumes without salary history will not be considered) to Mike Teague.

MICROIMAGERY GROUP
1451 Quail Street Newport Beach, California 92660

BELL & HOWELL
An Equal Opportunity Employer M/F

APPLICATIONS PROGRAMMER ANALYSTS

This is an opportunity for Programmer/Analysts with at least 1 year experience to become a part of a sophisticated large scale data processing environment which includes an Amdahl 470 and a Nationwide TP Network.

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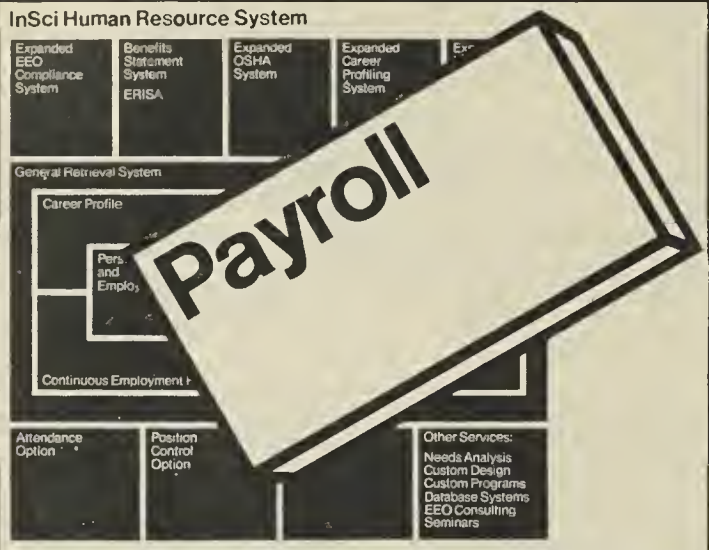

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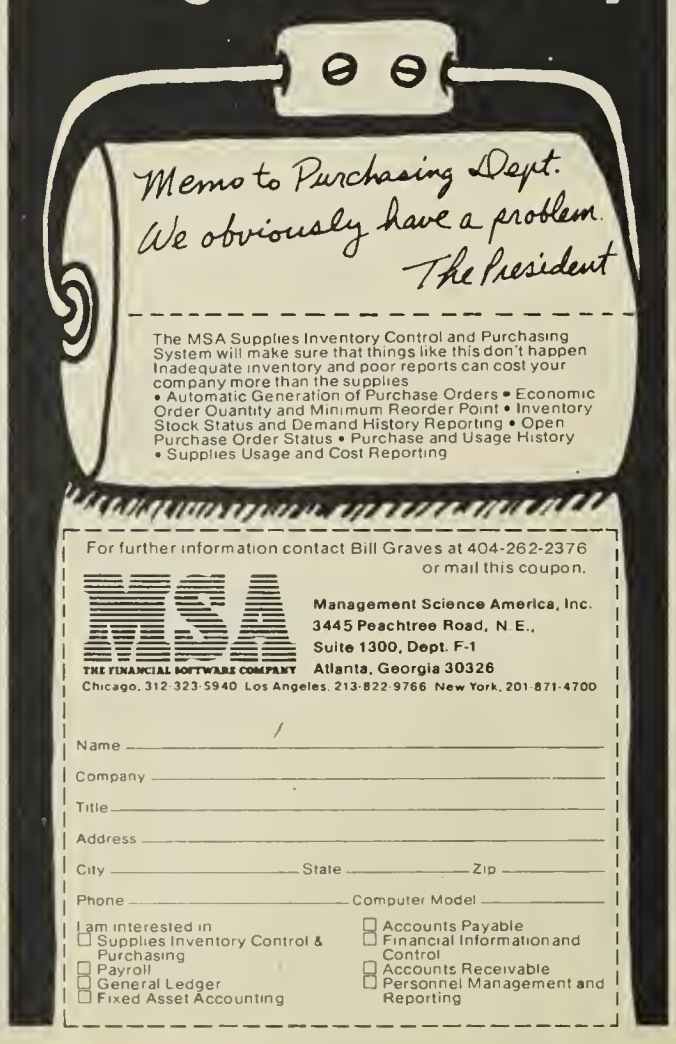

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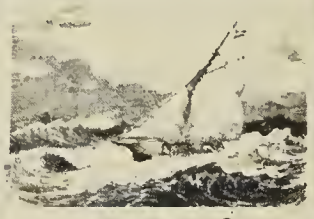

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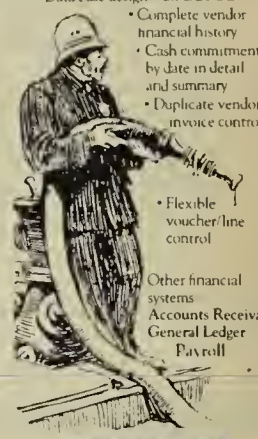

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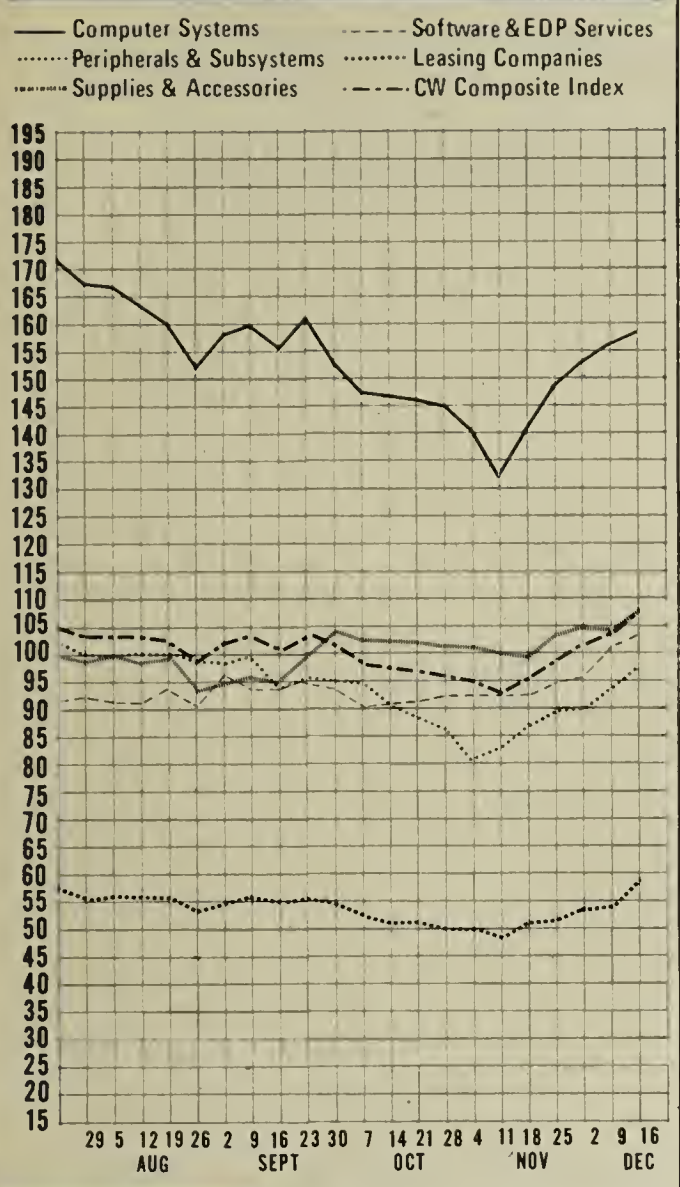
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

INFOREX
Three Months Ended Oct. 1

	1976	1975
Shr Ernd	$.24	$.11
Revenue	15,501,000	13,734,000
Tax Cred	275,000	.....
Earnings	708,000	.313,000
9 Mo Shr	.53	.20
Revenue	45,884,000	41,462,000
Tax Cred	644,000	58,000
Earnings	1,560,000	584,000

ITEL
Three Months Ended Sept. 30

	1976	1975
Shr Ernd	$.60	$.41
Revenue	60,600,000	58,200,000
Earnings	3,900,000	2,700,000
9 Mo Shr	1.51	.93
Revenue	180,000,000	139,100,000
Earnings	9,900,000	6,500,000

KEYDATA
Year Ended July 31

	1976	1975
Shr Ernd	$.40	$.17
Revenue	14,878,000	13,478,000
Tax Cred	515,000	200,000
Earnings	1,102,000	452,000

LITRONIX
Three Months Ended Oct. 3

	1976	1975
Shr Ernd	$.10	$.12
Revenue	12,714,000	13,203,000
Earnings	239,000	294,000
9 Mo Shr	.....	.29
Revenue	34,026,000	36,866,000
Earnings	(4,278,000)	727,000

MARTIN MARIETTA
Three Months Ended Sept. 30

	1976	1975
Shr Ernd	$1.17	$.91
Revenue	323,221,000	290,113,000
Earnings	27,662,000	21,416,000
9 Mo Shr	2.55	1.76
Revenue	899,222,000	782,333,000
Earnings	60,211,000	a41,429,000

a-Includes $5,300,000 gain from real estate sale in lieu of condemnation.

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 15, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1976 RANGE (1)	CLOSE DEC 15 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMDAHL CORP	23- 37	36 1/4	+3 1/4	+9.8
N	BURROUGHS CORP	84-108	87 3/8	-1 3/8	-1.5
O	COMPUTER AUTOMATION	10- 19	17	- 1/2	-2.8
N	CONTROL DATA CORP	18- 27	25 3/8	+1 7/8	+7.9
N	DATA GENERAL CORP	40- 60	43 1/2	+ 5/8	+1.4
O	DATAPOINT CORP	24- 46	28 1/2	-3	-9.5
O	DIGITAL COMP CONTROL	2- 7	6 1/4	+ 1/8	+2.0
N	DIGITAL EQUIPMENT	46- 60	53	-1 1/8	-2.0
N	ELECTRONIC ASSOC.	2- 5	2 1/4	+ 1/8	+5.8
A	ELECTRONIC ENGINEER.	7- 16	8 1/4	+ 1/4	+3.1
O	FOUR-PHASE SYSTEMS	13- 21	16 3/8	- 1/4	-1.5
N	FOXBORO	28- 51	49 7/8	- 1/4	-0.4
O	GENERAL AUTOMATION	4- 11	7	+1	+16.6
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	80-117	86 3/4	-1 1/8	-1.2
N	HONEYWELL INC	34- 56	46 1/8	- 5/8	-1.3
N	IBM	227-288	268 3/4	-4	-1.4
O	MANAGEMENT ASSIST	1- 9	7 5/8	- 3/4	-8.9
O	MEMOREX	17- 33	23 3/4	+2 1/2	+11.7
O	MICRODATA CORP	10- 28	16 7/8	0	0.0
O	MODULAR COMPUTER SYS	3- 14	5 1/4	+ 1/8	+2.4
N	NCR	24- 37	36 1/8	+1	+2.8
O	PRIME COMPUTER INC	4- 18	17 1/4	+ 3/4	+4.5
N	PERKIN-ELMER	19- 27	19 5/8	-1 1/4	-5.9
N	RAYTHEON CO	45- 67	61 1/8	- 5/8	-1.0
N	SPERRY RAND	40- 52	46	+2 1/4	+5.1
O	SYCOR INC	9- 31	13	- 1/2	-3.7
A	SYSTEMS ENG. LABS.	5- 10	6	- 1/8	-2.0
N	VARIAN ASSOCIATES	12- 17	14	- 1/8	-0.8
A	WANG LABS.	11- 20	14 3/8	- 3/4	-4.9
	LEASING COMPANIES				
O	BOOTHE COMPUTER CORP	1- 8	7 1/2	0	0.0
O	COMDISCO INC	3- 10	9 1/4	+ 1/4	+2.7
A	COMMERCE GROUP CORP	2- 3	1 3/4	+ 1/8	+7.6
A	COMPUTER INVSTRS GRP	1- 3	1 7/8	0	0.0
M	DATRONIC RENTAL	1- 8	1	- 1/8	-11.1
A	OCL INC	1- 1	1	+ 3/8	+60.0
N	ORE INC	5- 8	7 1/8	0	0.0
N	ITEL	6- 15	13	+ 5/8	+5.0
N	LEASCO CORP	6- 20	18 3/8	-1 1/8	-5.7
O	LEASPAC CORP	0- 1	1/8	0	0.0
O	NRG INC	0- 1	1/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 1/2	- 1/8	-1.6
N	U.S. LEASING	7- 12	10 1/8	+ 1/4	+2.5
O	DATA ACCESS SYSTEMS	1- 5	4 1/4	0	0.0
O	DATA 100	6- 13	7 3/4	+1	+14.8
A	DATA PRODUCTS CORP	5- 15	12 1/4	0	0.0
O	DATA TECHNOLOGY	1- 2	2 3/8	+ 1/2	+26.6
O	DATUM INC	1- 2	1 1/4	+ 1/4	+25.0
O	DECISION DATA COMPUT	1- 4	2	+ 3/8	+23.0
O	DELTA DATA SYSTEMS	1- 1	1/2	0	0.0
N	ELECTRONIC M & M	1- 4	3 1/4	- 1/8	-3.7
O	FABRI-TEK	1- 1	3/4	-	-7.0
O	GENERAL COMPUTER SYS	0- 2	3/8	+ 1/8	+50.0
N	HAZELTINE CORP	4- 12	9 3/8	+ 1/8	+1.3
N	HARRIS CORP	34- 57	57 1/4	+1 1/8	+2.0
A	INCOTERM CORP	9- 20	12 3/4	-1 3/4	-12.0
O	INFOREX INC	3- 7	5 3/8	+1 1/8	+26.4
O	INFORMATION INTL INC	10- 18	11 7/8	- 1/8	-1.0
O	INTEL CORP	47-109	54 1/2	-1 1/2	-2.6
A	LUNDY ELECTRONICS	3- 7	3 7/8	0	0.0
O	MSI DATA CORP	3- 7	6 3/8	0	0.0
N	MILGO ELECTRONICS	15- 22	21 1/4	+ 1/2	+2.4
N	MOHAWK DATA SCI	3- 10	6 1/8	+ 1/4	+4.2
O	PENPIL CORP	1- 3	2	+ 1/8	+6.6
A	PERTEC CORP	3- 8	6 7/8	- 1/4	-3.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	1 1/2	- 1/2	-25.0
O	QUANTOR CORP	4- 6	5 1/8	- 1/2	-8.8
O	RECOGNITION EQUIP	6- 11	9 7/8	+ 3/8	+3.9
N	SANDERS ASSOCIATES	6- 11	10 1/4	+1 1/8	+12.3
O	SCAN DATA	1- 4	1 1/4	+ 1/8	+16.7
O	STORAGE TECHNOLOGY	9- 13	11 1/8	- 1/2	-4.3
O	T BAR INC	5- 10	7	+ 5/8	+9.8
O	TALLY CORP.	4- 6	5 7/8	+1 1/8	+23.6
O	TEC INC	3- 9	9	0	0.0
N	TEKTRONIX INC	45- 69	65 1/4	+2 3/4	+4.3
N	TELEX	2- 5	2 5/8	0	0.0
O	WANGCO INC	11- 22	18	- 1/2	-2.7
O	WILTEK INC	2- 2	1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/4	- 1/8	-3.7
A	BARRY WRIGHT	6- 10	9 5/8	+ 3/8	+4.0
O	CYBERMATICS INC	0- 1	1/2	0	0.0
A	DATA DOCUMENTS	25- 45	45	+2 3/4	+6.5
O	DUPLEX PRODUCTS INC	13- 24	13 3/4	+ 3/4	+5.7
N	ENNIS BUS. FORMS	6- 8	5 7/8	- 1/8	-2.0
O	GRAHAM MAGNETICS	8- 13	10	- 1/2	-4.7
O	GRAPHIC CONTROLS	13- 19	15	- 1/4	-1.6
N	3M COMPANY	53- 66	55 3/4	+ 1/2	+0.9
O	MOORE CORP LTD	32- 51	33 3/4	+ 3/4	+2.2
N	NASHUA CORP	11- 19	19 1/4	+1 1/4	+6.9
O	STANDARD REGISTER	15- 19	18 1/4	+ 3/4	+4.2
O	TAB PRODUCTS CO	5- 11	11	+1	+10.0
N	UARCO	19- 25	21 1/8	+ 3/4	+3.6
A	WABASH MAGNETICS	4- 11	10 7/8	+ 3/8	+3.5
N	WALLACE BUS FORMS	19- 25	21 1/4	- 1/2	-2.2
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 1/8	- 1/8	-10.0
O	ANACOMP INC	6- 11	6 5/8	+ 1/4	+3.9
A	APPLIED DATA RES.	2- 5	5	+ 3/8	+8.1
N	AUTOMATIC DATA PROC	17- 35	29 7/8	- 1/2	-1.6
O	COLEMAN AMERICAN COS	2- 6	2 3/8	0	0.0
O	COMPU-SERV NETWORK	3- 10	8 1/4	- 1/4	-2.9
O	COMPUTER DIMENSIONS	3- 7	6 7/8	+ 1/2	+7.8
O	COMP ELECTION SYSTMS	5- 9	5 1/2	0	0.0
O	COMPUTER HORIZONS	1- 2	1 1/4	- 1/4	-16.6
O	COMPUTER NETWORK	2- 8	6 3/8	- 3/8	-5.5
N	COMPUTER SCIENCES	4- 8	7	- 1/8	-1.7
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	2- 6	2 1/2	0	0.0
O	COMSHARE	2- 9	5 1/2	- 1/2	-8.3
O	DATA DIMENSIONS INC	2- 5	5 1/8	+1 1/4	+32.2
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	16 1/2	+ 1/4	+1.5
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	2 5/8	+ 7/8	+50.0
O	IRS COMPUTER MARKET.	1- 2	1	0	0.0
O	KEANE ASSOCIATES	2- 4	2 1/8	- 3/8	-15.0
O	KEYDATA CORP	1- 5	1 5/8	0	0.0
O	LOGICON	3- 8	7 3/8	- 1/8	-1.6
A	MANAGEMENT DATA	1- 3	2	0	0.0
A	NATIONAL CSS INC	13- 25	23	+2 1/4	+10.8
O	NATIONAL DATA CORP	4- 7	4 7/8	+ 1/8	+2.6
A	ON LINE SYSTEMS INC	17- 23	21 7/8	-1	-4.3
N	PLANNING RESEARCH	3- 5	3 5/8	0	0.0
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 5	2 1/8	0	0.0
O	REYNOLDS & REYNOLD	13- 21	17 3/4	+ 3/4	+4.4
O	SCIENTIFIC COMPUTERS	1- 1	7/8	+ 1/8	+16.6
O	TYMSHARE INC	14- 28	17 3/4	- 1/2	-2.7
A	URS SYSTEMS	3- 5	3 7/8	0	0.0
N	WYLY CORP	1- 7	1 5/8	+ 1/4	+18.1
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	8- 13	12 1/4	+ 7/8	+7.6
O	ADVANCED MEMORY SYS	4- 10	7 3/4	+ 1/8	+1.6
N	AMPEX CORP	5- 10	7 1/4	+ 1/2	+7.4
O	ANDERSON JACOBSON	2- 4	3	+ 1/4	+9.0
O	APPLIED DIG DATA SYS	13- 25	16	- 1/4	-1.5
O	BEEHIVE MEDICAL ELEC	3- 11	10 7/8	+1 1/4	+12.9
A	BOLT,BERANEK & NEW	7- 11	7 1/8	- 5/8	-8.0
N	BUNKER-RAMO	5- 10	8 3/4	+1 3/8	+18.6
A	CALCOMP	4- 7	4 1/4	+ 1/4	+6.2
O	CAMBRIDGE MEMORIES	0- 6	3/4	+ 3/8	+100.0
N	CENTRONICS DATA COMP	20- 36	26	+ 7/8	+3.4
O	CODEX CORP	22- 42	31	-2	-6.0
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 6	4 1/2	- 1/8	-2.7
O	COMPUTER CONSOLES	4- 7	5 1/2	+ 1/4	+4.7
A	COMPUTER EQUIPMENT	1- 3	1 7/8	+ 1/4	+15.3
O	COMPUTER TRANSCEIVER	1- 3	5/8	0	0.0
O	COMTEN	4- 10	9 3/4	+1 1/8	+13.0
N	CONPAC CORP	20- 27	26 5/8	+ 3/8	+1.4

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